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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/933,868	08/22/2001	Frank Burgel	3864-8	6357

23117 7590 10/25/2005

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

EXAMINER

CORRIELUS, JEAN M

ART UNIT PAPER NUMBER

2162

DATE MAILED: 10/25/2005

RECEIVED
OICE/IAP

OCT 28 2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/933,868	BURGEL ET AL.	
	Examiner	Art Unit	
	Jean M. Corrielus	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 11-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 11-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment filed on August 9, 2005, in which claims 1-5, 11-29 are presented for further examination.

Response to Arguments

2. Applicant's arguments filed on August 9, 2005, with respect to the rejection(s) of claim(s) 1-5 and 11-29 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of a new ground of rejection.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-5 and 11-29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The word "*substantive*" does not really describe the characteristic of the ser input and it does not add any weight to the claimed language.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims 1-5 and 11-29 are rejected under 35 U.S.C. 102(a) as being anticipated by Kings College London “Photography and Design services”.

As to claim 1, Kings College London discloses a software solution for creating a fully electronic poster. Kings College London states that a poster is an advertisement for your ideas, findings and techniques and needs to attract readers from a distance in a sea of other displays. Using a poster template from the web site, Kings College London discloses the claimed “enabling a user to input user-selected design parameters for a scientific poster” by having users to selected their own design parameters using the poster templates, wherein each template is a pre-designed, large-format PowerPoint page set to the average conference poster, the templates vary only in shape and color of the user choice (stage 1, initial design); “generating a sample poster according to the user-selected design parameters and confirming the user-selected design parameters” it is noted a template files for scientific posters is found in the internet by conducting a search in Google for “poster template” and then adding the application name, PowerPoint that allows to create a poster as a single oversized presentation slide (stage 1); “storing user-input substantive data in a dedicated vault and uploading the user-input substantive data” after the pre-designed poster template ha been created, it uploaded in the internet for future use (stage 2); “building an image of the scientific poster according to the user-selected design parameters and the user-input

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substantive data” since the poster template can be modified, such a pre-designed poster template is used to create a scientific poster according to the user-selected design parameters (stage 1 and 2); and “delivering the scientific poster according to a desired delivery process including by posting the scientific poster image on an Internet web page a wherein step (d) is practiced by linking designated files from the user's dedicated vault and wherein when one or more of the designated files is modified. step (d) comprises updating the scientific poster image according to the modified files” (once the template is downloaded from the Internet, such template can be modified based on the user preference (stage 1 and 2).

As to claim 2, Kings College London discloses the claimed “wherein step (a) is practiced by enabling the user to input user-selected design parameters including at least one of poster size, orientation, figure placement, resolution, paper type, and colors” (see stage 1 and 2).

As to claim 3, Kings College London discloses the claimed “wherein step (a) is practiced by enabling the user to select a poster size from a plurality of predetermined poster sizes or enabling the user to input a custom poster size” (see stage 1 and 2).

As to claim 4, Kings College London discloses the claimed “wherein step (a) is practiced by providing access to a poster gallery including a plurality of poster samples and enabling the user to input poster design parameters by selecting one of the poster samples” (by having users to selected their own design parameters using the poster templates, wherein each template is a pre-

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designed, large-format PowerPoint page set to the average conference poster, the templates vary only in shape and color of the user choice (stage 1, initial design))

As to claim 5, Kings College London discloses the claimed “between steps (d) and (e), the step of providing the image of the scientific poster to the user for review and effecting any necessary edits according to the user's review” (once the template is downloaded from the internet, such template can be modified based on the user preference (stage 1 and 2).

As to claim 11, Kings College London discloses the claimed “enabling password or ID access to the internet web page” in order to conduct a search to Google for poster templates, one must be granted access to the network.

As to claim 12, Kings College London discloses the claimed “wherein step (e) is practiced by incorporating hyperlinks in the web page that lead to supplementary information” (using the URL link to download poster templates over the internet or by conducting a search in Google for “poster templates” (stage 1 and 2).

As to claims 13-15, the limitations of claims 13 and 14 have been mentioned in the rejection of claim 1 above. In addition, Kings College London discloses the claimed “delivering the scientific poster according to a desired delivery process, wherein step (a) is practiced by enabling the user to input drill-down components of the scientific poster, wherein step (c) is practiced by uploading drill-down component data from the user, and wherein step (d) is practiced by

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incorporating the drill-down components into the scientific poster image and enabling access to the drill-down components through the image” (once the template is downloaded from the Internet, such template can be modified based on the user preference, using the software based solution, PowerPoint (stage 1 and 2)) and “delivering the scientific poster according to a desired delivery process, wherein step (a) is practiced by enabling the user to input dynamic components of the scientific poster, wherein step (c) is practiced by uploading dynamic component data from the user, and wherein step (d) is practiced by incorporating the dynamic components into the scientific poster image and enabling access to the dynamic components through the image” (once the template is downloaded from the Internet, such template can be modified based on the user preference, using the software based solution, PowerPoint (stage 1 and 2)).

As to claims 16-20, Kings College London discloses the claimed “storing data for processing the scientific poster according to searchable database categories” using Google to search for poster templates of a scientific poster (stage 1); “wherein the searchable database categories comprise at least one of author, subject matter, conference, and date (stage 1 and 2)”; “editing the scientific poster image according to user instructions” (once the poster template has been downloaded, a modification of user preference can be establish); and enabling selective access by a plurality of users to the scientific poster image in a collaborative virtual laboratory, wherein the editing step is performed according to an instruction from any of the plurality of users with selective access” (stage 1, 2 and 3).

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As to claims 21-27, the limitations of claim 21-27 have been noted in the rejection of claims 1-5 and 11-20 above. In addition, Kings College London discloses a software solution for creating a fully electronic poster. Kings College London states that a poster is an advertisement for your ideas, findings and techniques and needs to attract readers from a distance in a sea of other displays. Using a poster template from the web site, Kings College London discloses the claimed "enabling users to create scientific posters according to user-selected design parameters and user-input substantive data;" by having users to selected their own design parameters using the poster templates, wherein each template is a pre-designed, large-format PowerPoint page set to the average conference poster, the templates vary only in shape and color of the user choice (stage 1, initial design); "producing the scientific posters according to user-selected production methods" it is noted a template files for scientific posters is found in the internet by conducting a search in Google for "poster template" and then adding the application name, PowerPoint that allows to create a poster as a single oversized presentation slide (stage 1); "archiving the scientific posters and cross-referencing related scientific posters" after the pre-designed poster template ha been created, it uploaded in the internet for future use (stage 2); "building an image of the scientific poster according to the user-selected design parameters and the user-input substantive data" since the poster template can be modified, such a pre-designed poster template is used to create a scientific poster according to the user-selected design parameters (stage 1 and 2); and "enabling access to the scientific posters via the global network" (once the template is downloaded from the Internet, such template can be modified based on the user preference (stage 1 and 2).

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As to claim 28, Kings College London discloses a computer program running on a user computer that executes input information related to user selected design parameter (see stage 2); a server program running on a server computer system connects to a computer network to build an image of the scientific poster (an application program loaded on the computer network allowing to by having users to selected their own design parameters using the poster templates, wherein each template is a pre-designed, large-format PowerPoint page set to the average conference poster, where the templates vary only in shape and color of the user choice and wherein the scientific posters is found in the internet by conducting a search in Google for "poster template" and then adding the application name, PowerPoint that allows to create a poster as a single oversized presentation slide; and wherein the user input data is stored in a dedicated vault, wherein the designed can be modified (once the template is downloaded from the Internet, such template can be modified based on the user preference (stage 1 and 2).

As to claim 29, the limitations of claim 29 have been noted in the rejection of claim 28 above. It is, therefore, rejected under the same rationale.

Note: It is important to note that the invention as claimed is old and well known in the computer system environment, where scientific poster templates are generated and stored in the network for use. So, the templates files for scientific poster s can be found on the internet by conducting a search in Google for "poster template", wherein each template is a pre-designed, large format PowerPoint page set to the average conference poster size of A0, which the template's text can

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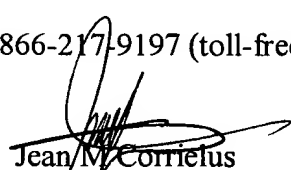
be replaced with user choice by re-typing or cut-and-paste and the figure can be imported using PowerPoint.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jean M. Corrielus whose telephone number is (571) 272-4032. The examiner can normally be reached on 10 hours shift.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jean M. Corrielus
Primary Examiner
Art Unit 2162

October 11, 2005

Notice of References Cited	Application/Control No. 09/933,868	Applicant(s)/Patent Under Reexamination BURGEL ET AL.	
	Examiner Jean M. Corrielus	Art Unit 2162	Page 1 of 3

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Poster presentation
	V	Tips for effective poster design.
	W	preparing professional Scientific Posters, Kristine A. Kirkeby
	X	How to prepare a poster, Kari Leinonen Ja pasi Puttonen

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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FOREIGN PATENT DOCUMENTS

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	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Preparing a Scientific Poster
	V	Advice on designing scientific posters, collin Purrington, Swarthmore College
	W	Kings College London, Design Services
	X	Scientific Posters

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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U.S. PATENT DOCUMENTS

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	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	Part III Geological Sciences, Preparing a scientific poster
	V	Scientific Poster Production Meta HowTo
	W	Today's Solution to all your Scientific Poster development, production and delivery needs
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

POSTER PRESENTATIONS

Purpose

Some people have strong memories of putting up posters on the wall in their primary school. A few think that in asking you to put up a poster of your own making we are treating you as primary school children. This is not so. Posters are an international method of communication. The primary schools have got it right in recognising that posters can be colourful, interesting, memorable and fun to make. Scientific posters are informative, too. Put up at meetings they let you advertise your interests to a substantial number of people. They also let you communicate in more detail to a smaller number of particularly interested people who are prepared to spend time absorbing the finer points of your message. This more detailed exchange takes place in a small group atmosphere where feedback to you, the poster maker, can flow freely. Scientific work these days is usually carried out in teams. One reason for the popularity of posters is that they allow several members of the team to contribute explicitly to the presentation, thereby reinforcing the team aspect of the work. These days, the majority of presentations at scientific meetings are poster presentations.

On making good posters

There is no set of rules you can apply that will automatically produce a good poster. Making a good poster is a creative experience. Our guidelines are based on many years of looking at posters at trade stands and reading scientific posters displayed at a wide variety of meetings, and many years spent making such posters. With some attention to the guidance we give, you should be able to do better than the average conference presentation.

Begin at the end. What is the purpose of the poster? The advanced technical conference poster aims at presenting information on a quite specific topic and coming to some conclusions. A practising scientist is likely to present work being planned, work in progress, or work just finished. Undergraduate posters are more likely to be a summary of a particular specialist area, or perhaps a biographical poster. Hence:

- *First general guideline:* decide on your conclusion and build the poster around that.

Scientific posters must have a technical content of some substance. However, you should take another leaf out of the advertisers' book and use short, direct sentences to tell your story. Don't make up the text as if you were delivering a learned talk on the radio. Remember to take account of the audience you're addressing, namely people who don't know the special jargon of the subject but can be assumed to have a general scientific education. You are the expert of the moment, not the audience. Most importantly, do tell a story. Writing a poster should be like writing a very short story, with introduction, content and, hopefully, a punchy conclusion. The poster should be self-sufficient. Anyone wanting further information can talk with you at the poster session, take a hand-out you might have (at a conference, not at your poster session, please) or follow up a reference you may give on the poster directing them to an article or, perhaps, a web page. Hence:

- *Second general guideline*: make clarity of message top priority.

Advertisers are in the business of trying to create a single, lasting message by means of a poster. You'd really quite like to do that too. Your poster will not be very successful if the sight of the poster next door makes the on-looker completely forget about yours. The advertiser's technique is to rely 95% on visual impact and keep the word count very short. Too many conference posters have poor visual impact. In a conference poster session there may be 200 posters competing for attention in the afternoon. If your display has little visual impact, it is likely that the participants will have forgotten about you and your work by the end of the afternoon, good and painstaking though it was. A few already in the field will have stopped to read the detail, but the rest won't. In technical meetings, where you may be trying to sell your ideas to potential sponsors or buyers, this is not what you want. Hence:

- *Third general guideline*: make visual impact a high priority.

A 'scientific' poster tries to convey much more than a slogan. Nonetheless, participants at a poster session will be suffering from word overload. What are they going to read first? The title. Make sure it is bold and clear, and the authors' names equally visible. It is common at conferences to include a photo of the authors to help identify whom it is standing beside the poster who should be asked for further information. This can be a moderate quality, scanned picture. In this day and age, specialist knowledge of the kind you are assembling on your poster is power, money and your ticket to continued employment. Your name will be the most important two or three words on the whole poster. Get used to associating your name with the provision of high quality, thoughtfully interpreted information. A poster is an advert that you have this expertise. Make sure your name is prominent. Hence:

- *Fourth general guideline*: make the title and authors names stand out at the top of the poster

- *Guidance on words*:

- Make your title clear, to the point and prominent
- Show the names of the contributing authors beside the title, in large type
- Remember that the poster should be readable from a distance of at least 1 metre. Don't use type less than 18pt
- Use a simple font, not some ornate script that is hard to read (people won't bother)
- Tell a story - a story with technical content. Be numerate where required and include the odd vital equation, properly explained, if it is vital
- Keep the word count as small as you can, consistent with worthwhile content

- Use language appropriate to the audience
- Keep sentence structure direct and simple, without being repetitive
- Make the words and the graphics work together for you

Teamwork

For posters that are being put together by a small team, arrange to get together with the other team members over a cup of beverage or otherwise and try to tease out what strengths you all bring to the team. Library research will be necessary. Partition out this research, if possible identifying an appropriate theme. Arrange to bring your results to a meeting at a particular time and place.

Firm up on the contents of the poster. Try to find out which members of the team are good with pictures, which with words, which with putting together a story and so on. Try to organise the team so that people do what they are best at.

Partition the job of preparing the ingredients. Give one person the overall charge of the final production (the production manager). Make sure others deliver their components in time. You can put the whole thing together in software as a single sheet (on say the large-format printer in the library). However, this is time-consuming, expensive and needs software and experience beyond anything we currently teach. It is not expected. The traditional assembly method is 'cut-and-paste', using real scissors and glue.

More on making it happen

- Use your Internet search skills and your University Library experience to obtain material.
- Get going immediately. Things always go wrong or take longer than you expect. Posters can't be planned and executed in an evening. Your first target should be a simple list of headings for possible story-line components and accompanying graphics.
- Aim to get together a first draft of the text, graphics and layout no later than one week before your presentation.
- Making a poster is an example of an open-ended task. Perfectionists find such tasks particularly difficult because it's hard to know when to stop. The course guidelines should imply or say explicitly how much time should be spent on the poster. Don't aim to produce something so fancy and elaborate that it will take longer.
- Here are a few assembly hints (not rules):
- make your heading big and bold
- use muted colour or grey for the background; more intense colour for borders if you have coloured borders

- put darker pictures on a light background and vice-versa
- a neutral colour in the background will emphasise colour in a picture
- if necessary, show the progress through separated story elements by conspicuous arrows.

Assessment - The CAS scale

The CAS marks are labels. The CAS scale is not a numerical score of the kind you get when you add up the number of multiple-choice questions that you might have got right out of 20. In the CAS scale, each broad category, like 'first class', has 3 labels, which you can think of as 'lower', 'middle' and 'top'. Thus, 'first class' has labels 18, 19 and 20; 'lower second class' has labels 12, 13 and 14. When marking on CAS scale, which is ideal when there are judgements to be made against set criteria, first decide on the right broad category and then divide it more finely.

Our CAS interpretation for poster displays

First Class; **Outstanding**

CAS 18, 19, 20; Excellent presentation. Clear title and author list. For visual material: a striking overall appearance, coherence between different parts, excellent choice of images, graphics and text well integrated. For text: a fluent story, excellent choice of language, very good balance of technical terms and explanation, very clear explanation, where appropriate, with no obvious errors. Overall, signs of initiative and creative ability.

Upper Second Class; **Very Good**

CAS 15, 16, 17; Generally very good graphics; poster well made, with pleasing overall look. Clear title and author list. For text, an appropriate story, clearly told with no significant errors. Separate blocks of text clearly linked.

Lower Second; **Competent**

CAS 12, 13, 14; Basically sound with graphics good in parts though lacking coherence; some conflict in styles of separate parts. Workmanship moderate. For text, story with one or two of the following defects: disjointed or tending to be too long or too short, off the point or with a few inaccuracies, or not very well phrased.

Third Class; **Borderline Pass**

CAS 9, 10, 11; Minimum acceptable effort has gone into the poster. Worthwhile information presented but clearly with little effort being put into its presentation. Text showing two or three of the following defects: too long, too short, not well expressed, difficult to understand without input of more technical knowledge, technically inaccurate in places.

Fail ; Borderline Fail

CAS 6, 7, 8 ; Overall poor presentation giving appearance of hurried assembly, with little coherence in story, obvious omissions or inaccuracies of reasoning.

Fail; Comprehensive Fail

CAS 1, 2, 3, 4, 5; Individual levels not defined but posters with little more than a title and a few sheets of A4 showing copies of web pages will fall into this category.

CAS 0; Failed to appear or submit any work

JSR

**Metallurgy and Materials Case Studies - Teaching
and Learning Resource**

University Fast Forward

**METALLURGY AND MATERIALS
CASE STUDIES - TEACHING AND
LEARNING RESOURCE****General Information**

- Introduction
- Case Study Teaching
- Case Study Theory
- Student Perception of Case Studies
- Learning Resources and Links
- Contacts

Case Studies

- Metallurgy and Materials Science
- Sports and Materials Science
- Biomaterials/Bioengineering
- Technology

Group Working

- Why work in groups
- Tips for effective group working
- Tips for effective meetings
- What's your role in a group?
- Group roles
- Example agenda
- Example minutes
- Resources and Acknowledgements

Assessment Information

- Guidelines for levels
- Group and peer assessment

Tips and Advice

- Tips for effective presentation
- Tips for effective poster design
- Tips for writing reports

Search

☒ SEARCH THIS SITE☐ SEARCH WHOLE UNIVERSITY**Tips for Effective Poster Design****Scientific Posters**

As an engineer, it is important to be able to communicate your work and ideas effectively using a variety of presentational methods. Posters can be a useful form of scientific communication and are regularly used in presentations at meeting conferences. They are static, visual displays that enable you to directly discuss your work and receive instantaneous feedback.

Although it is assumed that the poster will do most of the talking, it is the role of the presenter to answer questions and explain the work in further detail. A successful poster will not only attract a viewer's attention, but will also outline accurately and concisely the aims, workings, and conclusions of your scientific research. Below are some suggested guidelines to help you prepare a successful and effective poster.

**Content**

- Determine how large your poster will be and how much space you have allocated. Once you know this, you can begin to work out how much information you can include. The purpose of a poster is not to simply stick everything of information you have on a board, but to be succinct and clear in what you are trying to present. Be clear as to the message that the poster is presenting and ensure that relevant results are presented and discussed.
- Think about your audience and what you are trying to achieve with your poster. This will help to determine your poster style. For example, posters that are conveying a simple message (e.g. billboards and poster campaigns) tend to be very visual with a non-technical content. By comparison, scientific posters have a more detailed and complex content.
- Typically, a poster should contain: a title section, abstract or summary, introduction, aims and objectives, methodology, results, discussion and conclusions. You may also want to include a section detailing suggested future work.

further work; you could recommend how your work could be developed or suggest other tests that could be applied.

- Keep your title short and to the point so as to grab the attention of the audience. The title section should also include the names of the people involved in the project.
- Be selective in the results you include in your poster, display only the most important results representing the main findings of your work, you can always keep other results close to hand in case you are asked about them. Use figures to present data in a concise form e.g. showing trends, but refer to figures where they support your conclusions.
- The conclusion of your poster should be the climax of your work, and address the main aims and objectives of the project.

Layout and Format

- It is very important that the text and data included in your poster follow a logical and hierarchical order. When we approach new information we tend to read from top to bottom and from left to right. Therefore, it makes good sense to lay your work out in this order. You could, for example, place your abstract in the top left corner and the conclusions in the bottom right corner. Remember that the poster should be able to lead the reader through the work presented.
- An alternative layout to the one described above is to place the conclusion in the centre of the poster and have the supporting work radiating out from it.
- It may be helpful to provide arrows that direct attention to the sequence of the presentation. Excessive augmentation, however, can be distracting and confusing.
- Keep the column widths at a size that is easy to scan.
- Try not to present long and detailed sections of text. Bullet points can be more effective and will maintain the reader's interest.



Images, Graphs and Photographs

- If used in the correct way, graphics and visual images can greatly enhance a poster, increasing both understanding and interest. However, ensure that all graphics are relevant to your work, and linked by references e.g. figure 1 in the text.
- Make sure that all diagrams are clearly captioned and easily seen. For example, a micrograph should be around 120 - 80 mm in size. Captions should be placed below the diagram/figure and the figure should be placed close to the text.

text.

- Whenever possible captions on graphs and diagrams should read horizontally (exception to this is the vertical axis label on a graph).

Style

- Keep it simple, clear and concise. Obviously the poster needs to be eye-catching and attractive, but filling up your poster space with excess clutter can be distracting for the viewer.
- Ensure that your font size is large enough to be legible from at least a distance of 2m (e.g. 16 - 18 for the text and 24 - 36 for titles). Individuals will soon tend to lean in or squint to read small text.
- Try to use one or two font types at most. Too many font types can look confusing, particularly if they are in the same sentence or paragraph. Choose fonts that are easy on the eye, such as Times Roman or Arial.
- Use caps and lowercase instead of all caps for easier reading.
- Maintain a consistent style throughout.

Colour

- Using colours on your poster is a useful way of attracting attention and enhancing your work impact. However, be careful to use colour sparingly and with discretion, too many colours or borders can be distracting and look unprofessional.
- Try to avoid bright, noisy or clashing colours.
- A good tip is to use background and foreground colours that complement each other and have high contrast. This will ensure that your text and images stand out.
- If you are using coloured text, make sure that it contrasts with the background paper, as it can be frustrating for the viewer to search for text that appears camouflaged.

PREPARING PROFESSIONAL SCIENTIFIC POSTERS

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A scientific poster is a communication tool which combines a verbal presentation with a visual aid. They are given to a small group of people, are limited in time and range of view, and are informal and interactive. Posters should look as professional as your professional research. Poster size specifications will differ for each conference; always plan to use the space well. Incorporating good basic graphic design principles, using good quality art materials and papers, and the use of color as an organizing tool will contribute to the professional approach of this scientific communication. The average interaction time for a poster presentation is 10-15 minutes. You must use visual short-cuts and plan your verbal presentation carefully to do posters well.

Note: **Bold text** denotes important time-saving steps

Poster Pre-planning and Preparation

- The preparation process takes longer than you think, so get started early. Write introduction and methods now!
- Review text and poster approach with advisor and other major collaborators!!

Photos & Visuals

- Get photo processing started as soon as possible; e.g. making negs. and prints, prints from slides, labeling on prints.
- Remember to print photos to an appropriate size for the poster (usually 5" x 7").
- Use color photocopies when possible for quick, cheap, while-you-wait, good quality reproductions.
- Look for illustrations or photos to shorten needed text. They may be reproduced from books or slides via color photocopy.

Text

- Remember that preparing a poster is very different from preparing a paper. **You will not be enlarging your research paper and wallpapering the display board.** Your main objective in preparing text for this presentation is to edit it down to very concise language. Use bullets and

numbers to break text visually and aid you in the interactive use of your poster.

- A suggested title format is 90 pt Helvetica or a sans serif font, use bold as this reads better from a distance. Sub titles should be 72 pt.
- Divide your title information into: Title; Name(s); Department; University of Minnesota; City; etc.
- Within the poster presentation space divide information into - Introduction; Methods; Results; Summary; Acknowledgments (optional). Provide references in handout form as they are not necessary for Poster presentations and reduce needed space.
- Other poster text should be **18 pt**; space and a half; bold. **Never** use smaller than 14 point print.
- **Spell check** and proof text very, very carefully before your final print out.

Layout

- Join split-page text pieces so you can photocopy it as one sheet using 11 x 17 paper (less gluing, easier reading).
- When you have the text, photos, and visuals prepared/planned, do a **scaled layout** using a planning grid with scaled-to-size post-it-notes. This allows you to plan the flow of information quickly and accurately as well as to assess space. It greatly aids you in your final layout assembly.
- **Adjust** copy to grid plan, editing if needed; do a final spell and text proof; laser print onto colored paper, or photocopy laser quality white copy onto colored papers. If you are using drop-shadowing remember to allow for those additional border dimensions in your layout. Do not laminate.

Poster Assembly

- **Roughly lay out your title, text, photos, tables, visuals, etc. on the mat board, checking fit.**
- **Trim** down all the pieces (1/2 inch borders, marked lightly in pencil, use a paper cutter), trim photos (spray matte finish).
- Trim drop-shadowing pieces **with** overlaid pieces to save trimming time
- **Measure and lightly mark** with a soft lead pencil, the position of each piece on the mat board, using the t-square for accuracy.
- Line up the t-square on the guide you have marked for the first piece you want to glue down.
- For gluing, use 3M 'Photomount' spray glue. This glue is easy to position yet has a firm tack. A more expensive but handy product is 'StudioTac by Letraset' which is a pressure release adhesive-film. However, its tack will only last for one year.
- Working in a vented hood, lay down hood lining paper. Spray your poster pieces 3-4 inches away from the surface. Spray parallel with surface of the paper. Do not tilt the can toward the back of the hood as you spray or spray too close to the vent - the fan will pull the glue up the vent before it even hits your paper. **Do not spray too heavily or too lightly.** If you get glue on the printed side it doesn't come off. Changing hood lining sheets often.
- Using the t-square as a guide, lay glued piece on board and press it down into position using a roller. Do other pieces.
- Do not move the poster for about 8 - 10 hours to allow glue to set firmly.

Preplanning

- Remember that posters are labor intensive, get started well before the due date.
- Write your intro/abstract, methods and materials as soon as possible.

- Take your photos well ahead to plan for possible re-dos and enlargements.
- Trimming and neat paste-up will determine the visual quality of your poster - take care.

Set-up

- Pick up boards
- Roughly layout everything on boards, using completed planning grid.
- Pick out colors - use color to organize information, this is not interior decorating time.
- Use 1 color for title, intro. and conclusion, 2nd for rest.
- Use 3 colors to further accent results from methods and material.
- Don't use too many colors.
- Drop sheeting/shadowing (outlining with other color) means double gluing.
- Use 11 x 17 sheets for title (cut to 8.5 x 14 for laser printing).

Photos

- Crop/trim with exacto knives, not paper cutter, use sharp blade.
- Matt spray photos (takes 5-10 min. to dry); may need 2 coats, do early before friends start spray gluing in same space.
- If your photos are the only thing not ready, cut dummy sheets to 5 x 7 or whatever your photo size is to lay temporarily in place on your board, come in later and finish that portion.

Layout

- **Join text or figures with figure notations pieces together before copying onto colored paper**
 - this reduces no. of pieces to glue and makes it easier to get aligned neatly in the gluing process
- Lay down the first piece on the light table or on a window, tape in four corners with small pieces of tape, using another text page (example page) that matches your line spacing for the two pages you want to hook together-lay the example page over the first page, so that you have a line of text on the example page extending past the last line of text of the first page, also place it to the left or right of the first page so you can flip it out of the way after you have laid down the joining page (tape on the left or right side only) use the line of text on the example page to guide your placement of the joining page; holding the first page and joining page in place with one hand, flip the example page out of the way and tape the joining page down.
- Use tape to finally join the pieces together firmly for photocopying.
- Do you need 11 x 17 size for copying?
- Get extra sheets for each color for your copying laser printing onto color paper. Cut on the boards provided with the exacto knives, not on benchwork.
- Change exacto blades often.
- Use Master subtitle copies to make a copy in your color.
- Cut subtitles out using clear rulers, not paper cutter, glue on last using glue stick, ditto for smaller pieces.

Trimming

- **Draw a pencil line on each piece to be trimmed using plastic rulers.**
- Align clear plastic rule on the last line of text so that you have 1/2" for border.
- Draw 1 line only with soft lead pencil.
- Place on the paper cutter so pencil line lays on the cutting edge" cut

- Use this straight cut as your guide line for other edges; turn and using grid on the cutting boards trim to 1/2 on other 3 borders.
- If you are drop sheeting/shadowing, hold drop sheet and your printed page together as you trim to save double trimming time.
- **Titles**
 - using the light table or window with strong light, tape three pieces over each other using the lines above and below title as a cutting guide line; align exactly; slowly trim with exacto knife.
- Glue the title on last with the subtitles.

Paste-up Marking

- **Mark boards for gluing** (do this after you have glued together the dropsheeting/shadowing pieces, see gluing directions below).
- Using the t-square against the straight edge of the mat board, make two short marks one below the sheet and one to the side. Make these marks for each piece on the board. Do not draw around each piece - it wastes time, means more erasing, etc.
- Watch for coincidental line-ups
- Use a soft lead pencil or photo-blue pencil on dark boards.

Gluing

- **Gluing drop sheet/shadow pieces**
 - use the plastic grids to align the drop sheet, tape in place so you won't have that tape under a glued edge spray glue the front piece (remember, not too much, not too little-see below), using the grid as a guide lay one corner down, pivot the piece into place along the guide line; use roller to press downsheet firmly but not on "dropped" portion.
- **To glue all the pieces on...**
 - lay t-square in place before you go to hood to glue piece,
 - spray in hood-not too much, not too little
- **Use tweezers to pick piece up off surface in hood, then take in hands, leave tweezers there**
- Pivot corner, using the t-square as laying-down-guide.
- Roller down, or put blank, clean paper over and press hard over entire surface, this step is important or after a bit
- They will pop up, usually after you have left but in time for the poster symposium .
- Lay down fresh glue catch-sheets in hood frequently, don't cover up and lose the tweezers in this step!
- Re-lay t-square and go to next piece. You are a half hour from the finish now!
- Remove glue from finger tips with 95% ETOH provided.
- Glue title, smaller pieces and subtitles.

Final Touches

- Try using the "rubber-cement-picker-upper" square to remove really "gluie" spots.
- Use white vinyl eraser to remove pencil marks.
- Brush off board and bring to storage box. Place carefully so you don't damage the ones next to yours
- See first step on this sheet!
- You're outta here!
- Hinge/cut down after the poster symposium for traveling home. Allow 1" all around and trim to

half individual pieces or hinge.



Ohjeita posterin laatimista varten

Kari Leinonen ja Pasi Puttonen (toim.)

How to Prepare a Poster

Modified from Sven Hammarling and Nicholas J. Higham

<http://www.siam.org/siamnews/general/poster.htm>

Poster presenters and conference organizers alike should take posters seriously, giving thought to their preparation and display and to their role in a conference.

Poster sessions are an increasingly important part of scientific conferences, and many of us are rather inexperienced in their preparation and presentation. Having been involved in organizing and judging poster sessions, however, we have given some thought to what we consider to be desirable features of a poster.

What Is a Poster?

A poster itself is a visual presentation comprising whatever the contributor wishes to display on the poster board. A poster is very different from a paper or a talk, and so different techniques need to be used in its preparation. In particular, a poster is not a conference paper, and simply pinning a paper to a poster board usually makes a very poor poster. A poster board is typically 4 feet (120 cm) high and 6 feet (180) wide, but the reverse orientation (tall and thin) is also seen. It is advisable to check beforehand on the size of the boards that will be available to you. Usually, a poster is made up entirely of sheets of paper pinned or attached with velcro strips to the board, but there is no reason why other visual aids should not be used. The pins or velcro are usually provided with the board by the conference sponsors.

The purpose of a poster is to outline a piece of work in a form that is easily assimilated and stimulates interest and discussion. The aim is a fruitful exchange of ideas between the presenter and the people reading the poster, but you should not be disappointed if readers do not stop to chat—a properly prepared poster will at least have given useful information and food for thought.

A Poster Tells a Story

In preparing a poster, simplicity is the key. A typical reader may spend only a few minutes looking at the poster, so there should be a minimum of clutter and a maximum of pithy, informative statements and attractive, enlightening graphics. A poster should tell a story. As always in a scientific presentation, the broad outline includes a statement of the problem, a description of the method of attack, a presentation of results, and then a summary of the work. But within that format, there is much scope for ingenuity. A

question-and-answer format, for example, may be appropriate for part of the poster.

A poster should not contain a lot of details—the presenter can always communicate the fine points to interested participants. In particular, it is not a good idea to present proofs, except in brief outline, unless the proofs are the focus of the presentation. Keep in mind that the poster will be one of many in the exhibition area: You need to make sure that it will capture and hold the reader's attention.

The poster should begin with a definition of the problem, together with a concise statement of the motivation for the work. It is not necessary to write in complete sentences; sentence fragments may be easier to comprehend. Bulleted lists are effective. An alternative is to break the text into chunks—small units that are not necessarily paragraphs in the usual sense. For presenting results, graphs and figures—easier to scan than the columns of figures in a table—are even more appropriate than in a paper. Legends should be minimal. A brief description of the implications of a graphic, placed just above or below it, is helpful. For ideas on graphic design, a wide selection of books is available. Conclusions, again, should be brief, and they should leave the reader with a clear message to take away.

Designing Your Poster

Suggestions on the physical design of a poster range from the obvious to the not so obvious. First, as we mentioned earlier, it is definitely unacceptable to post a copy of a paper!

A poster is usually formed from separate sheets of letter paper: 8 × 11 inches (U.S.) or A4 (Europe). The number of pages should be minimized—for these sizes a suggested maximum is 15. But larger sheets, or even sheets of differing sizes within one poster, can also be very effective.

Whatever the size of the sheets, the typeface chosen should be considerably larger than standard. Because not all readers will have perfect eyesight, and because the crowd of readers around a popular poster may be several people deep, the type should be easily readable by a person standing a few feet away. In particular, the title of the poster and the author's name should be large and prominent. If it is not convenient to print directly at the desired typesize, pages can be magnified on a photocopier. Good use can be made of color, both to provide a more interesting image and for color coding of the text. A colored backing card for each sheet can be effective. For added interest, try including an appropriate cartoon, photograph, or quotation. There is plenty of scope for creativity.

If the sheets are arranged as a matrix, two layouts are possible: horizontal (reading across the rows) and vertical (reading down the columns). While the horizontal ordering is perhaps more natural, it has the major disadvantage of requiring the reader to move to and fro along the poster; if there are many readers, congestion can result. A vertical ordering is therefore preferable, although other possibilities should be considered as well. If you are comparing three methods, for example, you could display them in parallel form, in three rows or columns, perhaps as a "display within a display." Consider the possibility of arranging the poster to represent some feature of the problem, such as a particular sparsity structure of a matrix. If there is any doubt about the order in which the sheets should be read, guide the reader by numbering the sheets clearly or linking them with arrows. Think carefully about the use of the poster board. One extreme is to spread the sheets out to make full use of the board—taking care to position them at a height at which they can be read by both the short and the tall. If there are only a few sheets, it may be best to concentrate them in a small area, where a reader can proceed from beginning to end while standing in one position.

Transportation and the Poster Session

Transporting a poster can be a problem if it contains large sheets of paper. Rolling the paper into a cylinder is the most common system. You will usually be allotted plenty of time to set up the poster, so it may be easiest to bring it in pieces, to be assembled on site (but be sure to work out the layout beforehand—and bring a diagram!). If the work presented in the poster has been described in more detail in a paper, consider making the paper available as a handout at the poster session.

Once the session starts, stand near the poster but not in a position that obscures it from view. Be prepared to answer the questions that a good poster will inevitably generate. But keep in mind the advice of one expert: "A presenting author at a poster session should behave like a waiter in a first-class restaurant, who is there when needed but does not aggravate the guests by interrupting conversation every ten minutes to inquire whether they are enjoying the food" [1].

References

[1] Robert R.H. Anholt, *Dazzle 'em With Style: The Art of Oral Scientific Presentation*, W.H. Freeman, New York, 1994.

[2] Diane L. Matthews, *The Scientific Poster: Guidelines for Effective Visual Communication*, *Technical Communication*, 37 (3) 1990, 225–232.

Hints for poster preparation

Modified from "Chemistry in Britain", Vol. 9(1983), p. 181.

<http://www.sfu.ca/~goddyn/Sci010/010posterguide.html>

Content

Is the topic and its treatment appropriate for a poster?

Excessive quantities of facts and particularly subtle arguments tend not to be appreciated, especially if the author is not immediately available to act as guide.

Arrange the material in a logical sequence, and make sure the poster is self-contained if it will be on display in the author's absence. It is helpful to start with a concise introduction and end with brief conclusions particularly when the participants have an overwhelming choice competing for their attention.

Use of colour can be very helpful both in maximizing the clarity of diagrams and in making the poster attractive.

The title should be bold and informative, of course. It is a good idea to design and position the title panel last. A striking effect can be obtained from an awkward remaining space.

Authors

Photographs can be useful in making contact at large international gatherings. When posters are on show for extended periods, indicate when the authors will be in attendance.

Handouts

If you would like people to have a permanent record, have handouts available, either from the author or in a folder attached to the poster board.

Text and tables

Artistic considerations favour the minimum of textual and tabular material, but scientific considerations generally demand several paragraphs of text and one or more tables of results. Be as succinct as possible, but not to the point of incomprehensibility.

Photographic enlargement of typescript improves legibility of reading, though some typefaces look rather unattractive when magnified. (However, they still look infinitely better than the handwriting of 99 per cent of the scientific population.)

Figures and diagrams

These are to be preferred over text and tables wherever possible. Obviously it is a great help to have the assistance of someone with an aptitude for technical drawings but in these days of stencils, expanding and reducing Xerox machines, and computer graphics even the hamfisted scientist can produce neat and attractive illustrative material.

Do's and Don'ts of Poster Presentation

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Biophysical Journal, 71: 3527-3529 (1996)

<http://www.molbio.princeton.edu/block/poster.html>

Words of Caution

This guide offers advice on preparing a good scientific poster. As with all communication, which is an art form, there is no single recipe for success. There are many alternative, creative ways to display and convey scientific information pictorially. Occasionally, breaking with tradition can pay off, but not always. More often than not, an iconoclastic approach will revile and repel, rather than amaze and astound. Consider yourself forewarned! Unless you have some prior experience under your belt, or feel pretty certain of your ground, it's a better idea to leave experimentation to the laboratory, and stick with tried-and-true methods for your poster presentations. The suggestions here certainly won't improve your

science, but if followed, may help you to communicate your message. You should, before deliberately departing from these guidelines - and they are only that - at least attempt to understand the reasoning behind the advice. Remember that when it comes to posters, style, format, color, readability, attractiveness, and showmanship *all count*. Take the time to get things right.

Poster Layout & Format

DON'T - make your poster up on just one or two large boards. These are a clumsy nuisance to lug around. They put large strains on poster pins and often fall down. They frequently don't fit well into the poster space you are provided. They don't lend themselves well to re-arrangement, alignment, or last-minute modifications.

DO - make up your poster in a large number of separate sections, *all of roughly comparable size*. The handiest method is to mount each standard-sized piece of paper individually on a colored board of its own, of slightly larger dimensions, say, 9.5" × 12" (A4), or thereabouts. This frames each poster segment with a nice border and makes for a versatile poster that can be put up anywhere, yet knocks down easily to fit into a briefcase or backpack for transport.

DON'T- write an overlong title. Save it for your Abstract. Titles that use excess jargon are a bore. Titles with colons in them are a bore. Titles that are too cute are even more of a bore.

DO - keep your title short, snappy, and on target. The title needs to highlight your subject matter, but need not state all your conclusions, after all! Some good titles simply ask questions. Others answer them.

DON'T - make the title typesize too large or too small.

DO - make your title large enough to be read easily from a considerable distance (say, 3—8 m), so it will perforce span more than one printed page. Nevertheless, the title should never exceed the width of your poster area (particularly if you are sharing half a posterboard with a neighbor!), nor should it ever occupy more than two lines. If things don't fit, *shorten the title*—don't reduce the typesize! And remember that titles in all caps are harder to read.

DON'T - leave people wondering about who did this work.

DO - put the names of all the authors and institutional affiliations just below (or next to) your title. It's a nice touch to supply first names, rather than initials. Don't use the same large type size as you did for the title: use something smaller and more discreet. This is not the cult of personality.

DON'T - use too small a typesize for your poster. *This is the single most common error!!* Never, *ever*, use 10- or 12-point type. Don't use it in your text, anywhere. Don't use it for captions. Don't use it for figure legends, annotations, footnotes, subscripts, or anything else. Don't ever use small type on a poster! Remember, no one ever complained that someone's poster was too easy to read. Got it?! Good!

DO - use a typesize that can be read easily at a distance of ~1.5 feet or better. You do

want a large crowd to develop around your poster, don't you? Think of 14 pt. type as being suitable only for the "fine print" and work your way *up* (never down) from there. 20 pt. type is about right for text (18 pt., in a pinch). Not enough space to fit all your text? Then shorten your text!

DON'T - pick a font that's a pain to read. Please, don't get too creative in your typeface selections: no one wants to struggle through a poster in Gothic or Broadway or Tekton or anything garish. Less obvious is the fact that sans-serif fonts, Helvetica, Universe, and Arial being the most common offenders, are more difficult to read, and certain letters are ambiguous (l = lower case 'l' and I = upper case 'I'). Serifs help guide the eye along the line, and have been shown in numerous studies to improve both readability and comprehension. Equally hard to read are most monospaced fonts, such as Courier. Generally speaking, it's better to leave Helvetica to Cell Press, reserving its use in posters for short text items such as titles and graph labels, and Courier to your aging typewriter, reserving its use in posters for nucleotide sequence alignments and suchlike.

DO - use a high-quality laser or inkjet printer to print your poster: no dot matrix printers, no typewriters, no handwriting. Select a highly legible font with serifs and a large "x-height." The x-height of a typeface is a typographer's term for the relative height of the lower-case 'x' compared with an uppercase letter, such as 'A', or a lowercase letter with ascenders, such as 'b'. A large x-height makes for easy reading from a distance. Good 'ol Times Roman and its look-alike clones represent the standard choice. But if you seek a different look, consider Baskerville, Century Schoolbook, Palatino, or anything else with proven legibility. Also, consider adjusting the kerning (the inter-letter spacing) for improved readability. This is particularly helpful when using large font sizes.

DON'T - vary the typesizes and/or typefaces excessively throughout the poster. For example, don't use something different for every bit of text and graphics.

DO - design your poster as if you were designing the layout for a magazine or newspaper. Select fonts and sizes that work together well. Strive for consistency, uniformity and a clean, readable look.

DON'T - make your reader jump all over the poster area to follow your presentation. Don't segregate your text, figures, and legends in separate areas.

DO - lay out the poster segments in a logical order, so that reading proceeds in some kind of linear fashion from one segment to the next, moving sequentially in a raster pattern. The best way to set up this pattern is columnar format, so the reader proceeds *vertically first*, from top to bottom, then left to right. This has the advantage that several people can be all reading your poster at the same time, walking through it from left to right, without having to exchange places. Consider *numbering* your individual poster pieces (1,2,3, ...) so that the reading sequence is obvious to all. And always make sure that all figure legends are located immediately adjacent to the relevant figures.

DON'T - use gratuitous colors. Colors attract attention, but can equally well detract from your message when misused. Fluorescent (neon) color borders just don't cut it

for posters. Neither do excessive variations in color (the 'rainbow look'). Forget paisley, tie-dye, stripes, polka dots, and batique. In your graphical items, use color with deliberation: avoid using it for its own sake, and avoid pseudocoloring when possible.

DO - by all means, use colors in your poster, and always try to use them in a way that helps to convey additional meaning. For color borders, select something that draws attention but doesn't overwhelm. For color artwork, make sure that the colors actually mean something, and serve to make useful distinctions. If pseudocoloring is necessary, give thought to the color scale being used, making sure that it is tasteful, sensible, and above all, *intuitive*. Also, be mindful of color contrast when choosing colors: *never place isoluminous colors in close proximity* (dark red on navy blue, chartreuse on light grey, etc.), and remember that a lot of people out there happen to be red/green colorblind. Please remember this advice when you create color slides and transparencies, as well!

Poster Content

DON'T - write your poster as one long, meandering thread.

DO - break your poster up into sections, much like a scientific article. Label all the sections with titles. Always start with an Abstract, and write up this section so it can be easily read and digested, in contrast to the abstracts found in some scientific journals. Remember, you are not compelled to put it all down in 150 words or less. Make sure that your Abstract contains a clear statement of your conclusions, so your reader will understand where you're headed, so to speak. Follow the Abstract with other sections that describe the Strategy/Introduction, Methods and Results (although you need not call these sections by those names). Display all your graphs, pictures, photos, illustrations, etc. *in context*. Write clear, short legends for every figure. Follow up with a Conclusions section. You may wish to add some kind of "Executive Summary" at the end: many successful posters provide a bulleted list of conclusions and/or questions answered/raised.

DON'T - ever expect anyone to spend more than 3-5 minutes (tops!) at your poster. If you can't clearly convey your message, pictorially, in less time than this, chances are you haven't done the job properly.

DO - get right to the heart of the matter, and remember the all-important "KISS Principle": *Keep It Simple, Stupid!* In clear, jargon-free terms, your poster must explain (1) the scientific problem in mind (*what's the question?*), (2) its significance (*why should we care?*), (3) how your particular experiment addresses the problem (*what's your strategy?*), (4) the experiments performed (*what did you actually do?*), (5) the results obtained (*what did you actually find?*), (6) the conclusions (*what do you think it all means?*), and, optionally, (7) caveats (*any reservations?*) and/or (8) future prospects (*where do you go from here?*). Be brief, and always stay on point.

DON'T - write your poster just as if it were a scientific paper. It's not. Don't waste lots of precious space on messy experimental details (skip a complete Materials and Methods) or on irrelevant minutia. Don't display every gel, every sequence, every genotype. *Don't ever* supply long tables: no one has the time or inclination to wade

through these. And don't ever lift long sections of text directly from some manuscript and use these as a part of your poster. A poster is not a worked-over manuscript.

DO - recall that a poster should be more telegraphic in style, and also far more accessible. Avoid jargon. Eschew obfuscation. Write plainly, simply, briefly - never cryptically. A little informality can help, but don't get too cute. Stress experimental strategy, key results, and your conclusions. Don't get bogged down in little stuff. Convey the Big Picture.

DON'T - leave prospective readers hanging, or assume they're all experts. They're not.

DO - consider adding a *helpful tutorial* section to your poster. For example, consider one or more of these additions to the 'standard fare': (1) a brief, possibly annotated bibliography, (2) a short account describing some special apparatus or technique, (3) a synopsis of the historical background of a particular scientific problem, (4) a pictorial glossary describing some jargon terms (e.g., a definition of "synthetic lethality" with an illustration of alternative ways it can develop), (5) an Internet address pointing to relevant material, (6) photographs of your setup, or (7) anything else that would help teach your readers what they need to know to understand and appreciate your work. *Use graphics!* Many of the items above are what an editor would call a 'sidebar' to the main story. Sidebars really help to communicate the message. Remember that you are the single best advocate of your own work.

DON'T - leave out the acknowledgments.

DO - remember that it never hurts to give credit where it's due. Write up a short acknowledgment section, including your sources of financial support and everyone who helped you to get this work done. No one was ever accused of being too generous, here.

DON'T - leave out the references.

DO - provide parties with routes into the literature and supply a context for your work. Poster references need not be as extensive as those in papers. If your poster work, or work closely related to it, has already been published, by all means display the citation(s). Footnotes are permissible, but keep these brief and avoid them entirely, if at all possible. People hate having to jump around while reading, particularly posters. Another useful bit of supplementary information to provide is the address of an Internet web site (URL) where more information can be found.

Poster Presentation

DON'T - leave everything until the last minute! Avoid resorting to hand-written text (no felt-tipped pens!) or using white-out. Don't hold everything together with tape. Be a pro.

DO - start putting your poster together early. Get the title and acknowledgments and bibliography other standard items out of the way *first*, so you aren't stuck at the last minute with these particular details. Experiment with type fonts and sizes and colors

and all that stuff from the start, and begin to plan your layout. Buy your posterboard, pushpins, etc., early. Pre-cut some posterboard pieces. Make up any graphics that you know in advance are destined for your poster. Do this soon, because you won't have the time later, and the color PostScript printer queue may be jammed with jobs from all your colleagues! Buy a can of spray mount (artist's adhesive) so you can dry mount all the poster segments. The best kind to get is the type that allows you to reposition the artwork without damaging it.

DON'T - stand directly in front of your poster at the session, or get too close to it. Don't become so engrossed in conversation with any single individual that you (or they) accidentally prevent others from viewing your poster.

DO - try to stay close by, but off to the side just a bit, so that passers-by can see things, and so that you don't block the vision of people already gathered 'round.

DON'T - be an eager beaver and badger the nice people who come to read your poster.

DO - give them some space. Allow them to drink it all in. If they engage you with a question, then that is your opening to offer to take them through the poster or discuss matters of mutual scientific interest. Conversely, don't ignore people who look as though they may have questions, especially by becoming engrossed in talking to all your buddies.

DON'T - pull a disappearing act.

DO - stick around. It's *your* poster, *your* work! Try to hang around for as long as you can to help and advise people. At the very least, give them a chance to associate a human face with your work. If you need to circulate, try to get a co-author to spell you.

DON'T - forget ancillary materials.

DO - be a good scout, and come prepared to your poster, armed with reprints of any of your own relevant papers that you might have, plus extra copies of any material you may wish to share. Have ready some business cards, or slips of paper you can use to provide colleagues with your address (or fax or email, or whatever). Posters are a terrific way to get scientific suggestions and meet like-minded individuals! And don't forget to bring plenty of push-pins, as well.

DON'T - hesitate to provide supporting materials, if these can help. But don't over-do it.

DO - consider using some kind of attention-getting gimmick, but beware that it doesn't backfire! Some posters employ a monitor on a cart and display videotape. Other interesting posters provide physical models or various kinds of three-dimensional display. Still others display actual data traces, or computer-based simulations, or something else that makes them stand out from the crowd. Provided that your 'hook' is legitimate, and *that it doesn't detract from the science*, or trivialize it in some way, this sort of thing can be eye-catching and helpful. Use good

judgment, here.

PREPARING A SCIENTIFIC POSTER

During the Michaelmas term of your fourth year, you will prepare a poster that summarises your Part III project work. The ability to design and produce an effective poster is now an essential research skill, because poster displays are a standard feature of most scientific conferences. This sheet gives some guidelines for successful poster production.

1. Poster format and purpose

- Your poster must fit on a vertical display board of a specified size. Those in the Earth Sciences department are typical, about 1200 mm wide by 900 mm high, with posters fixed by Velcro tabs on to a fabric surface.
- This size of display board can accommodate either
 - one A0 (1188 • 841 mm) sheet, arranged landscape (shortest dimension vertical), or
 - two A1 (841 mm • 594 mm) sheets, arranged portrait (longest dimension vertical), or
 - two Imperial (30" • 20" ... 760 mm • 510 mm) sheets, arranged portrait
- For conferences, your poster must be portable: either flexible enough to be rolled, or small enough to carry and maybe pack in luggage. Rigid A1 boards are unwieldy, and usually need cutting into halves (A2) or quarters (A3): this has practical design implications.
- The poster should have all the necessary text and graphics to make it self-explanatory. However, it should also be suitable for use at a formal 'poster session' where you might either have to summarise or field questions about your research in front of your poster.
- Your poster should offer something to two contrasting types of user: the 'browser', who may only give your work a brief look from a distance, and the 'ingestor' who pours in detail over every word and picture. Browsers need at least to see a clear title and one graphic that encapsulates the work and may attract them to look in more detail.
- Regard your poster as an advertisement for you and your work. A successful poster relies as much on effective design as it does on good science.

2. The components of a poster

Your poster will comprise some or all of the following design components:

- The *heading* comprises a title for the research, together with your name and affiliation. These items should be in a large enough font to be read at a distance of a couple of metres – at least 72 points (about 1") for the title and 36 points for your name.
- Your *contact details* should be included on a conference poster: a postal and Email address at least. This should be prominent, but in a smaller font than the heading. You can include your photograph to help people seek you out at a large conference.
- *Graphics* are the essential ingredient of any effective poster. They may comprise maps, charts, graphs, line drawings, photos, or any other relevant two-dimensional format. If possible, most graphics should be understandable without recourse to a detailed text caption. If possible, at least one graphic should be particularly eye-catching. Appropriate use of colour is essential.
- *Captions* are usually necessary adjacent to each graphic, to amplify its content for the detailed reader. However, captions should still be easily visible: use at least a 14 or 16 point font size.
- The *text summary* or *abstract* of the research has the same purpose as the abstract of a scientific paper, summarising the main results succinctly enough to be read in a minute or two.

This is the first and maybe the only component that browsers will read after they have been attracted by your title and graphics. The body text should be at least 16 or 18 point, with a larger or bolder title.

- The *body text* of the poster will describe methodology, data, results and interpretation. It should never dominate a poster – no more than a third of the poster should be text. The text should guide the reader logically through the graphics. The text is more digestible if it is split into logical sections interspersed with the graphics, rather than presented in one chunk. Use at least a 16 or 18 point font.

3. Planning the poster

- Decide the overall logic of the poster. Most posters have *sequential* sections, for instance aims > methodology > results > interpretation. However, other logical arrangements can be successful. A *radial* structure might have a hub comprising a text and graphic summary, surrounded by the discrete components of the project. Parenthetical *boxes* of text and graphics can amplify peripheral points in either a sequential or radial structure.
- List the graphics that you will need for the chosen structure. Do this *before* you write any text. You will then be forced to see the poster in the same way as the browsers who comprise the majority of your audience. You will almost certainly discover the need for a number of *interpretative graphics* to link and summarise the data and results that you already have available.
- Decide whether your poster components are to be *consolidated* on to one board, or *separated* on a number of smaller boards. The extreme strategy of putting each component on a separate small board makes for portability, but demands a lot of time (and Velcro!) to set up. Consolidation on A2 or A3 size sheets is a good compromise.
- Make preliminary pencil-and-paper sketches to explore how your graphics might fit your proposed poster layout. Allow some space for text at this stage.
- Make a physical mock-up of the poster. Either work at full scale, or at one-quarter or one-eighth scale on a piece of A4 graph paper. Use trimmed drafts of the actual graphics or scaled-down dummies. Do the same for captions, headings and the blocks of text. Physically rearrange all these components until you have a satisfactory layout.

4. Production

- These guidelines describe the *scissors-and-paste* method of production, where each component is physically stuck down on a poster board. You should use this method for your Part III poster.
- With the availability of A0 colour printers, *electronic* poster production is now popular, involving the assembly of components on-screen in a computer-graphics program. The two production methods differ little until their final stages, because most poster components are, in either case, produced by word-processing, graphics or presentation software. The main drawbacks of electronic production are the large file sizes needed for even a modest poster, and the cost of printing and laminating.
- Prepare all the individual components of the poster before pasting anything in its final position. This phase is the most time-consuming part of poster production. Getting the text to fit in the available space is a particular challenge. Always reduce the number of words rather than being tempted to reduce the font size below what is legible.
- Obtain the appropriate poster board. White A1 or imperial mounting board is available in the Drawing Office, or from Heffers Graphics Shop at about £2.50 to £3.00 per sheet. Coloured

board is about 50% more expensive than white board. Twice as expensive is a paper-faced 3.5 mm or 5 mm polystyrene sheet called Foamboard. This has no advantage for consolidated posters, but gives a pleasingly three-dimensional effect where components are separately mounted.

- Finalise the arrangement of components on the board. Either position them by eye, or use accurately measured faint blue crayon guide marks at two corners of each component.
- Stick down the components, fractionally overlapping any guide marks. Spray glue is convenient for most paper-based graphics or text. Lay the components, a few at a time, face down on a large desk-protecting sheet of plain paper. Spray components to their edges, leave for a minute or so, place in position, then press down firmly with a clean dry cloth or pad. Any traces of dried glue can be removed with a clean pencil rubber.
- Photographs are more safely fixed with 'Cow Gum' or with pads of double-sided tape. Spray glue is difficult to remove from photos.
- If the finished poster is going to be used repeatedly, it can be laminated with a plastic film. Enquire at print shops for costs. This is not necessary for a Part III poster.

5. Design hints

- Use a limited range of fonts and sizes. Two fonts, one for headings and one for blocks of text, are adequate. Use bold or italic versions of the same font in preference to a new font.
- Continuous text or figure captions can be read more rapidly in a *serif* font such as Times New Roman or Garamond. Headings have more impact in a *sans serif* font such as Switzerland or Arial, suitably emboldened.
- Use clear numbering or arrows to guide the viewer logically through a sequential poster.
- Use some colour on graphs, maps and other line drawings. Even limited use of a crayon or highlighter to emphasise key information makes a poster more lively and informative.
- Consider using a paper colour for the poster components that contrasts with that of the mounting board. White on a coloured background is the easiest effect to realise.
- The fashion for putting an outline box around every graphic, caption or block of text can look excessively busy. Boxes are better used to group related elements of the poster, such as data, methodology or results. Avoid the confusion of nested boxes-within-boxes.
- Do not rule out a 3D effect on part of your poster, as long as it can be transported and mounted satisfactorily. Simple examples are pin-and-string linkages between related elements, or foamboard mounts to key components. At the other extreme are sophisticated bits of paper engineering: see the childrens' section of any bookshop for what is possible.
- Don't fill every square centimetre of the poster board. Use as a design element in its own right, to separate components and logical sections.
- In summary, aim for simplicity not complexity, use graphics in preference to words, and remember that good content and design will always be more effective than sophisticated production techniques alone.

Nigel Woodcock
01/11/99

Advice on designing scientific posters

Colin Purrington, Department of Biology, Swarthmore College, Pennsylvania

A one-sentence overview of the poster concept

A scientific poster is a large document that can communicate your research at a scientific meeting, and is composed of a short title, an introduction to your burning question, an overview of your trendy experimental approach, your amazing results, some insightful discussion of aforementioned results, a listing of previously published articles that are important to your research, and some brief acknowledgement of the tremendous assistance and financial support conned from others—if all text kept to a minimum, a person could fully read your poster in under 10 minutes.

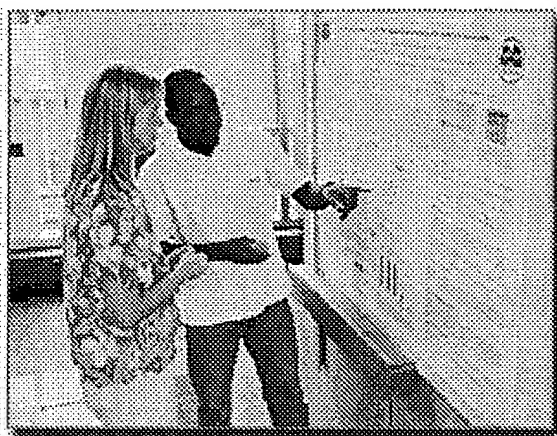


PHOTO BY ELEFTHERIOS KOSTANS/SWARTHMORE COLLEGE

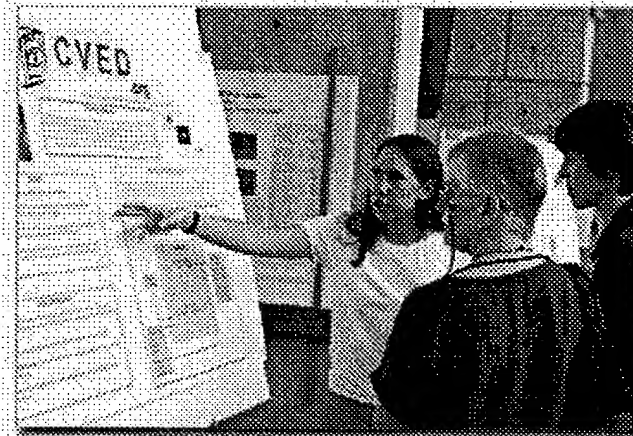


PHOTO BY BRUCE MAXWELL/SWARTHMORE COLLEGE

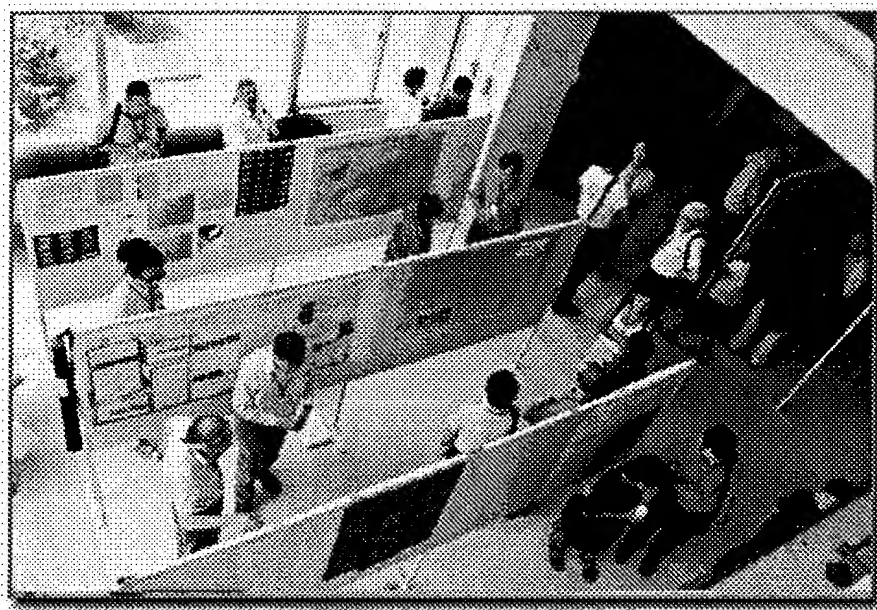
Students explaining their posters at the Sigma Xi Poster Session (Swarthmore College, 2004)

Why a poster is usually better than a talk

Although you could communicate all of the above via a 15-minute talk at the same meeting, presenting a poster allows you to more personally interact with the people who are interested in your research, and reach people who might not be in your specific field of research. Posters are more efficient than a talk because they can be viewed even while you are off napping, and especially desirable if you are terrible at giving talks. And once you have produced a poster, you can easily take it to other conferences such as more general scientific conferences sponsored by Sigma Xi, the Council on Undergraduate Research, American Association for the Advancement of Science (AAAS, or "Triple A-S" to most), the Federation of American Societies for Experimental Biology, and the Society for Integrative Biology. If you don't like to travel far, or are broke, many college and university science departments sponsor poster sessions that welcome students from nearby institutions. For all of the above, session organizers typically have a "Undergraduate Poster Prize Committee," which awards fame and often cold hard cash to deserving posters. And when you're ready to retire your poster from duty, you can hang the poster in your dorm room to impress your friends, or you can display it in your departmental hallway so that faculty can show off your hard work to visitors for years to come.

Motivational advice

The best general advice I can give a first-time poster constructor is to describe the circumstances in which a poster will eventually be viewed: a hot, congested room filled with people who are there primarily to socialize, not to look at posters. Because poster sessions are often concurrent with the (free) "wine and beer" session, chaos is further increased by hundreds of uninhibited graduate students staggering around hitting on each other. The scene below captures the cramped feel of most poster sessions, but lacks the typical density of viewers:

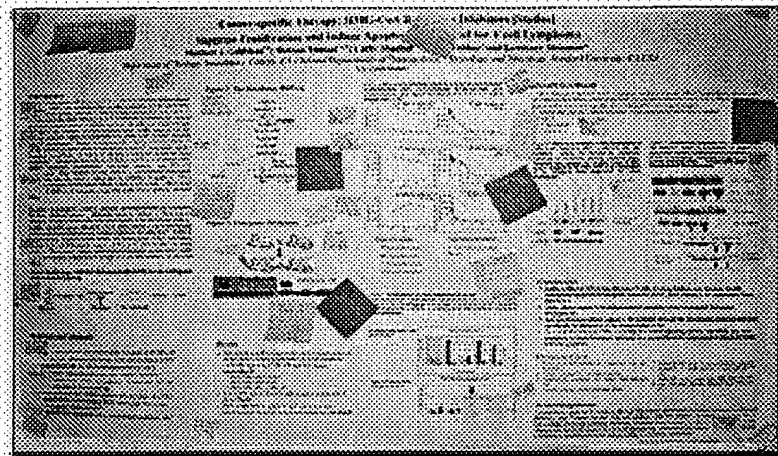


Photograph of a poster session

PHOTO BY CARLOS A. ALVAREZ ZARIKIAN /USGS, MIAMI, FL

Meeting organizers will invariably sandwich your poster between two posters that are infinitely more entertaining, such as "Teaching house cats to perform cold fusion" and "Mating preferences in extraordinarily adorable red pandas." In such a situation, your poster must be interesting *and* visually appealing if you hope to attract viewers.

The trick to producing a great poster is to embrace the rough draft process. Rough drafts are especially crucial in deciding whether you need to cut/add text or resize figures or fonts, decisions that can entail many hours of fussing and gnashing of teeth. You should produce a rough draft *at least* one month before it is due, and then bribe six people (friends, strangers, etc.) to look at it when you are *not* present--ask them to leave their suggestions on small Post-Its that you provide for them (e.g., as on poster shown below). Ask them to comment on word count, prose style, idea flow, figure clarity, font size, spelling. Note that you can print a miniature version of your poster on letter-sized paper to get a very rough sense of impending layout challenges, but such a shrunken version is extremely hard to critique and you will lose friends if you ask them to do so.



Rough draft of poster with Post-It suggestions

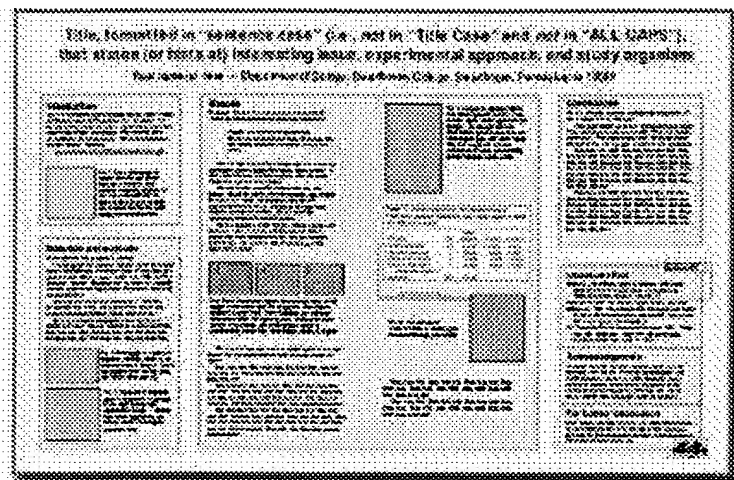
PHOTO BY COLIN PURRINGTON

Deciding between "arts and crafts" and software-generated posters

Unless you possess artistic ability *and* don't have anything else to do with your time, you should not attempt to build a poster by cutting and pasting content onto panels colored matte board, the default method for the most of the last century. Such "arts and crafts" posters, when *properly* executed, are far superior to anything that you could make with a poster printer, but they are not advisable for the busy artistically challenged.

Using a template

Template files for scientific posters can be found on the internet by conducting a search in Google for "poster template" and then adding the application name (e.g., Powerpoint). The Powerpoint template below ([download it](#), if you like it) is designed for a 36 x 56" poster, but it can be easily modified for other sizes. To get started, just replace the "dummy" text and graphics with real content, if you have it. In the template, page dimensions, column number, column width, and font size are all preformatted to produce a poster that is readable from 6' away. I have also designed this template to possess a good amount of white space, which is critical for a readable poster. Try to resist the inevitable directives from your mentor to cram this white space to include more background information or to include every single experiment you did. To encourage responsible use, the template invokes a Powerpoint macro that will deliver a mild, usual non-lethal shock via your keyboard when white space is decreased below 35%.



Powerpoint poster template. The template text contains further advice on poster design.

Invariably, you'll need to change the layout to accommodate the needs of your topic: if you would like to see some examples of how other people have modified or mangled this template, [check Google](#). Try to keep your word count as low as possible to maximize the chance that viewers will actually read your poster: shoot for 1000 words. This will be painfully difficult if you are attempting to fully document everything you have done, but posters with too many words will cause viewers to just read your figure more likely, to avoid your poster altogether.

Here's a nice example of a poster (for the Joint Statistical Meetings, 2004) that was made with the abc template:

Materials and methods: Briefly describe experimental equipment and methods, but not with the detail used for a manuscript; use figures and tables to illustrate experimental design if possible; use flow charts (the type with text and drawings within boxes) to summarize reaction steps or timing of experimental procedures; include photograph or labeled drawing of organism; mention statistical analyses that were used and how they allowed you to address hypothesis. [Maximum length: approximately 200 words.]

Results: First, mention whether experiment worked (e.g., "90% of the birds survived the brainectomy"); in same paragraph, briefly describe qualitative and descriptive results (e.g., "surviving birds appeared to be lethargic and had difficulty locating seeds"); in second paragraph, begin presentation of data analysis that more specifically addresses the hypothesis; refer to supporting charts or images; provide extremely engaging figure legends that could stand on their own (i.e., could convey some point to reader if viewer skipped all other sections, which they usually do); place tables with legends, too, but opt for figures whenever possible. This is always the largest section, except if you have no data. [Maximum length: approximately 200 words, not counting figure legends.]

Conclusions: Remind (without *sounding* like you are reminding) the reader of hypothesis and result, and quickly state whether your hypothesis was supported; discuss why your results are conclusive and interesting (attempt to *convince* reader of these points); relevance of your findings to other published work; relevance to real organisms in the real world; future directions. [Maximum length: approximately 300 words.]

Literature cited: Follow standard biology format *exactly* (don't wing this!); web sites and rumors you heard at Starbucks are equally undesirable sources: find a *journal* article that supports your needed fact. Also, if you haven't read a journal article completely (e.g., you could only view the abstract online) you may *not* cite it! [Maximum length: approximately 10 citations.]

Acknowledgments: Thank individuals for *specific* contributions to project (equipment donation, statistical advice, laboratory assistance, comments on earlier versions of the poster); mention who has provided funding; be sincere but do not lapse too much into informality in this section; do not list people's titles. Also include in this section *explicit* disclosures for any conflicts of interest and conflicts of commitment (more info). [Maximum length: approximately 40 words.]

Further information: There will be people, hopefully, who want to know more about your research, and you can use this section to provide your e-mail address, your web site address, and perhaps a URL where they can download a PDF version of the poster (edit so that URL is *not* blue and underlined). [Maximum length: approximately 20 words.]

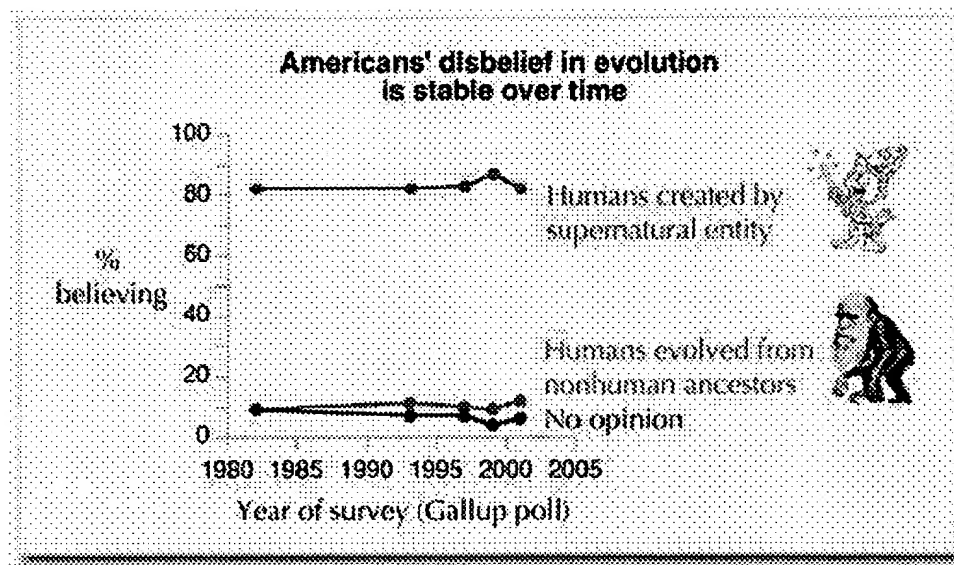
Avoiding common mistakes

- The number one mistake is to make your poster too long. Densely packed, high word-count posters are basically manuscripts pasted onto a wall, and attract only those viewers who are for some reason excited by manuscripts pasted onto walls. Posters with 1000 words are ideal. To view your word count in Powerpoint, go to the File menu and select Properties. For those who feel that their experiment somehow warrants an exception to this brevity advice (i.e., "everyone"), find a friend

help you edit, asking them, "What text, figure, or table could I possibly delete or modify?"

- Titles with colons: they are clunky. Coloned titles are sometimes devised in order to inject humor into an otherwise mind-numbing poster topic (e.g., "Mind-numbingly boring: brain MRIs of bo versus anesthetized adolescents," or, "Attack of the Crohn's: contribution of chromosome 16 all variants to inflammatory bowel disease progression"). The other motivation for using colons is provide greater detail about the general topic introduced by the first clause, which is purposeful vague so as to interest a wider viewership (e.g., "Causes of obesity: additive effects of inactivity *ad libitum* feeding on yearly weight gain in *Homo sapiens*"). Although humor and clarity are gr it is better to achieve them without a grammatical crutch. If you absolutely must have a coloned title, just be sure that it's not overly silly and that it doesn't force you to spill onto a third line. In recent years I have seen the rise of titles with two colons: these are even clunkier: the reasons a: really, really obvious.
- Format the title in "sentence case" (e.g., "Font abuse in inbred versus outbred populations of *H sapiens*"). Do not use "title case" (e.g., "Font Abuse in Inbred Versus Outbred Populations of *H Sapiens*") or "all caps" (e.g., "FONT ABUSE IN INBRED VERSUS OUTBRED POPULATIC OF *HOMO SAPIENS*"), which both undermine naming conventions that depend on font format (e.g., Latin binomials, genes, alleles). Another reason is that sentences formatted in these ways been shown (by science!) to require a few extra milliseconds for brains to interpret, and those milliseconds can add up to be annoying. (It is true, of course, that most posters and journal title: *used* to be set in either "title case" or "all caps," and thus many older scientists will invariably defend these styles To The Death, or TO THE DEATH.)
- Use a non-serif font (e.g., Helvetica) for title and headings and a serif font (e.g., Palatino) for b text (serif-style fonts are much easier to read at smaller font sizes).
- Do not "bullet" or otherwise punctuate section headers. The use of a larger font size for headers coupled with a simple "bolded" format, is sufficient for demarcating sections.
- The width of text boxes should be approximately 40 characters (on average: 11 words per line).
- Avoid blocks of text longer than 10 sentences.
- Whenever possible, use lists of sentences rather than blocks of text.
- Use *italics* instead of underlining.
- When using acronyms and numbers (e.g., ATP, 666) within the body of text, scale down the font by a couple of points so that their sizes don't overpower the lowercase text, which they would d you left them at the default size. Use of "small caps" will sometimes do the trick, but this effect varies with different fonts.
- Set line spacing of all text to be *exactly* 1, in case you have used super- or subscripted text.
- Do not trust the "tab" feature to insert the correct amount of space when you are indenting a paragraph (the default is usually too big). Set the tab amount manually, with the ruler.

- Correct any errors in spacing within and between words, especially before and after *italicized* text. Note that you can use a single space between sentences (the "double space" convention was needed for typewriters, and we are slow to lose the habit). Use the Search/Replace feature to globally "replace" all double spaces with single spaces, and to locate locations where many spaces occur between words.
- Because approximately 8% of males and 0.5% of females have some degree of color-vision deficiency, they see the world very differently than do wild type genotypes ([example](#)). Because there are so many different kinds of deficiencies, it is sometimes hard to remember which color combinations are "safe." To test whether you've made a terrible mistake in this regard, you can load an image of your poster onto the internet (as a PDF or JPG) and run it through the free [Vischeck](#) service, or you can download their Photoshop plugin that does the same thing: in both cases you will see your poster as color-deficients see it. In general, avoid using red and green together, and opt to use symbols and patterns instead of colors whenever possible. If you want to delve into the details of a particular color, refer to the Internet Technical Groups's interactive [Java program](#) or their [color table](#). See the Rigden article, below, for an excellent overview of color deficiency conditions and how to design for them.
- Similarly, if you have a color sensitivity mutation and don't know it, you might inadvertently design posters that are difficult for wild types to interpret. If you're curious, you can [test your color perception online](#) and get your pulse elevated for free. For the litigious and fun-averse, please [use the tepid version](#), instead. White males of European descent are especially encouraged to test themselves--they are disproportionately color deficient (see Keegan and Bannister 2004, below, for a likely consequence).
- If you are creating images on the computer, note that screen color (RGB mode) is different than printed, mixed-ink mode (CMYK). If you want your image to print as you see it, avoid RGB (i.e., change the mode to CMYK in Photoshop).
- Complete the entire poster on a single platform. Switching from PC to Mac and Mac to PC is a disaster, sometimes in the form of lost image files or garbled graph axes. Even if you are lucky enough to transfer content across platforms, switching in this way often creates printing problems in the future.
- Graph titles are not appropriate for laboratory write-ups and manuscripts, but they are great for posters. Having short, informative titles helps to lead the viewer more effortlessly through your poster.



Example graph (data from the [Gallup Organization](http://www.gallup.com))

- If you can add miniature illustrations to any of your graphs (e.g., as above), do it! Visual additions help attract and inform viewers much more effectively than text alone. Tables benefit from this as well.
- Most graphing applications automatically give your graph an extremely annoying key that you should *quickly* delete if you can directly label the different elements (as above). Interpreting keys is sometimes very difficult, and you should do anything in your power to make your graphs easy on the brain.
- Acronyms and other shorthands for genotypes, strains, and the like are great when talking to yourself but are terrible for communicating with others. On your graphs, use "english" and then the strain in parenthesis (e.g., "Control genotype (Col-0)").
- Y-axis labels aligned horizontally are much, much easier to read, and should be used whenever space allows. Viewers with hypertrophied, inflexible neck musculature will be especially appreciative.
- All graphs should have axis labels formatted in "sentence case" (not in "Title Case" and not in "CAPS").
- Never give your graphs colored backgrounds, grid lines, or boxes. If your graphing program gives them to you automatically, *get rid of them*.
- Never display two-dimensional data in 3-D. Three-dimensional graphs look adorable but obscure the true difference among bar heights.
- Make sure that details on graphs and photographs can be *comfortably* viewed from 6 feet away. A common mistake is to assume that figure axis numbers, labels, figure legend) are somehow exempt from font-size guidelines. On the contrary, most viewers will read *only* your figures!

- Powerpoint does not allow "wrapping" of text around inserted figures, so if you want this option for a particular section, you need to construct the paragraph or section as a separate Microsoft Word file (which *does* allow text to wrap), and then insert this Word file into your Powerpoint poster by the menu command, Insert: Object (select the "create from file" option). When you want to change anything, you merely double-click the section and the Microsoft Word file will be called up, magically, for you to edit.
- Never, ever incorporate "web" graphics without extreme caution. Most web images have 72 dpi of resolution, but *printing* at that resolution looks absolutely terrible, and the figure will be a huge turn-off to prospective viewers. And never, ever assume that your mentor has, or can *find*, a high-quality image to give you -- if they have anything, it is usually something pulled off the Internet. If you have access to a digital camera, use it to get a high quality photograph of your setup or organism (e.g., your *Drosophila* mutant, a close-up of your *Arabidopsis* in flower). Memory space is cheap on a digital camera, so take 100 photographs to ensure that at least one is a crisp detail, good composition, non-distracting background, etc. Sometimes to get the perfect shot you will need to seek out a microscope that has a camera attached to it. Run your best image through Photoshop to adjust contrast, image size, and sharpening. It should look professional when printed; if it does not, start over.
- If you include a photograph, add a thin gray or black border to make it more visually appealing -- remember not to overpower the image with an overly thick line. Choose a line color that is subtle, pleasing but barely noticeable to the viewer.



Photograph with and without an added border
PHOTOGRAPH BY COLIN PURRINGTON

- Institutional logos are great on departmental letterhead and college athletic caps, but are somewhat obnoxious on posters. If you are unable to control yourself, minimize the degree of pretension by hiding the logo (a *small* version) at the bottom of the poster in the Acknowledgements. An exception to this advice is when meeting organizers require the inclusion of a "meeting" or "society" logo at the top of the poster; this should *not* be viewed as an invitation to put your logo there, to



Swarthmore College logo (click on image for high res. version)

- If you are gluing higher resolution (e.g., 1200 dpi) images or photographs onto your 300-dpi poster, choose matte finishes for illustrations whenever possible to minimize glare (some of your viewers

will be standing off to the side of your posters at crowded poster sessions).

- If your topic is related to bird song (example), whale communication (example), herring burps (example), or other audio subject, do not pass up the opportunity to include a button-activated sample of your featured sound on your poster. Record your sample sound and then affix this device to an empty area in the appropriate section. Fill the picture frame with a figure legend on how to activate sound, or fill with a picture of the sound-generating organ. You can get these anywhere (e.g., Radio Shack or Targé) for about \$10, or you can find them on the Internet. You'll have the most gimmicky, well-visited poster in the whole session! If you don't do research on amusing noises, but still want a gimmicky, well-visited poster, consider lodging one of these gizmos in your Introduction area (perhaps, "Press this button for a 10 second overview of my poster," for when you are away from your poster).
- If your topic is related to olfaction, make sure that one of your figures is a scratch-n-sniff. If your topic is related to a vile odor, perhaps put the odor into a plastic bag next to an invitation to "open the bag, if you dare."
- If your topic is related to texture (e.g., thorns), make sure that you glue onto your poster an actual object, rather than a photograph.
- If you have three dimensional data or complex molecular structures, there are software programs that can print stereoscopic images that are viewable with cheap 3-D glasses. If you want to be especially nice to all viewers, have the stereoscopic figure hidden under a hinged panel on which the normal figure is displayed. Have a pouch near the figure so that viewers can help themselves to glasses even when you have abandoned your poster in search of more beer.
- Format your *Literature cited* contents according to the inflexible rules that the Council of Biology Editors (CBE) has set forth. References formatted according to guidelines of other disciplines, or references that are only haphazardly formatted at the last second, mark a poster as painfully unprofessional. When asking somebody to proof your poster, specifically ask them to be super-critical of your citation style. If your reference list becomes unusually long, you can sometimes shrink the font 3-4 points and then make a "2 column" citation list (but keep the section's heading sized to match rest of poster).

Presenting your poster

- If you are obsessive compulsive and have a large wardrobe, try to choose your clothes to match your poster color. Research (see Keegan and Bannister 2003 in "Useful literature") has shown that your poster will be avoided, a bit, when you clash. If you are color blind or fashion-impaired, please ask somebody to help you dress (a lame pick-up line, but give it a try if you're desperate).



Examples of good and bad poster/wardrobe coordination

PHOTO FROM KEEGAN AND BANNISTER 2003

- Do not wear a hat. Do not wear a muscle shirt. Etc.
- Wear a name tag, if possible, so that viewers know that the poster belongs to you.
- Do not chew gum or tobacco.
- Keep your hands out of your pockets, especially if you are a key or coin jangler. Fill your pockets with pushpins if you think you won't be able to resist.
- Do not refer to notes when explaining your poster.
- Speak to your *viewers* as you explain your poster.
- Point to specific parts of your poster whenever possible so that viewers are aware of your progression.
- Carefully walk your viewer through your figures. Avoid vagueness such as "this figure shows the main result."
- Keep a black pen and correction fluid in your pocket in case a viewer discovers an embarrassing typo.
- If more viewers arrive halfway into your spiel, finish the tour for the earlier arrivals first.
- When in doubt about how to act at your poster, imagine that a viewer will be considering your application for a job ten years into the future, or will be considering your graduate school application next week.
- Bring a small manila envelope of business cards to attach to your poster (via pushpins, or via a binder clip). Students: you can print up a small stack of business cards for the event (use Powerpoint, or download a dedicated card-design application if you're a real geek). Glue one of the cards to the outside so that viewers know the contents, and write, "please take one," or something equally inviting. (Note: your institutional logo will be on your cards, so having this item will reduce the compulsion to place a logo on the actual poster.)

- If you must leave your poster, affix a note alerting any viewers to your expected time of return telling them where you can be found (e.g., which bar).
- Have on hand, but do not aggressively peddle, manuscripts and reprints of your work.
- Also have on hand full-color, "shrunk" versions of your poster on 8.5 x 11" paper. If you have resisted the urge to shrink your font size, the shrunk text will be legible.
- *Thank* your viewers for visiting. If they have stayed more than 4 minutes, you have succeeded. If they say, "This is really interesting—I'll definitely come back later," you have failed.

Useful literature

Block, S. 1996. The DOs and DON'Ts of poster presentation. *Biophysical Journal* 71:3527-3529.

Briscoe, M.H. 1996. *Preparing Scientific Illustrations: A Guide to Better Posters, Presentations, and Publications*, 2nd ed. Springer-Verlag, New York.

Day, R.A. 1994. *How To Write and Publish a Scientific Paper*, 4th ed. Oryx Press, Phoenix.

Keegan, D.A., and S.L. Bannister. 2003. Effect of colour coordination of attire with poster presentation on poster popularity. *Canadian Medical Association Journal* 169:1291-1292.

Matthews, J.R., J.M. Bowen, and R.W. Matthews. 1996. *Successful Science Writing: A Step-by-Step Guide for the Biological and Medical Sciences*. Cambridge University Press, Cambridge.

Pechenik, J.A. 2004. *A Short Guide to Writing about Biology*, 5th edition. HarperCollins College Publishers, New York.

Rigden, C. 1999. 'The eye of the beholder'—designing for colour-blind users. *British Telecommunications Engineering* 17:2-6.

Tufte, E.R. 1983. *The Visual Display of Quantitative Information*. Graphics Press, Connecticut.

Wolcott, T.G. 1997. Mortal sins in poster presentations or, How to give the poster no one remembers. *Newsletter of the Society for Integrative and Comparative Biology* Fall:10-11.

Woolsey, J. D. 1989. Combating poster fatigue: how to use visual grammar and analysis to effect better visual communications. *Trends in Neurosciences* 12:325-332.

When you're ready to print

To print your poster in the Swarthmore College Biology Department, see directions at <http://www.swarthmore.edu/NatSci/cpurrin1/posterprint.htm> and then meet with Matt Powell (mpowell@swarthmore.edu), the Department's Business and Technology Manager. A larger, higher-resolution printer is located in the Faculty Resource Room, in Beardsley. If your Powerpoint file is unusually large, you may need to make modifications before the printer will be able to handle the job. So do not wait until the day before to start the printing process.

Note for the lazy

If you are well funded, you can always skip this long-winded advice by simply e-mailing your text and graphics (as attachments) to a company that will arrange, format, and print your poster to your specifications. They will then mail it (with pushpins if you need them!) to Swarthmore or directly to your meeting location. Search "[scientific posters powerpoint site.com](http://scientificposterspowerpoint.com)" on Google to get the names of some of these companies, or contact your conference organizers to see whether your society has a discount for a particular company.

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FEEDBACK: CPURRIN1@SWARTHMORE.EDU • UPDATED: 10.01.05
<http://www.swarthmore.edu/NatSci/cpurrin1/posteradvice.htm>

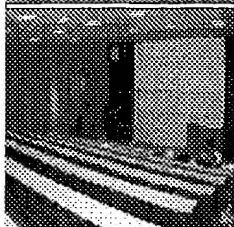
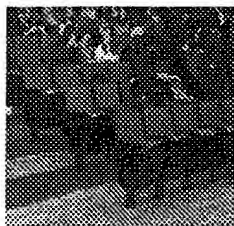
[Purrington Lab Home Page](#) | [Department of Biology](#) | [Swarthmore College](#)

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University of London

Design Services

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We provide a broad-based, creative design service and produce annual reports, brochures, scientific & advertising posters, computer slide design work, information leaflets, flyers, and scientific illustration.

New developments include video capture and digital imaging.

Graphic Design:

Whilst KCL corporate publications are produced by the Press and Publications Office, much of the publicity material throughout the King's Healthcare Trust and Guy's & St. Thomas NHS Trust is generated by our department.

Routine work includes brochures, reports, promotional posters, service information leaflets, flyers, letterheads, logo design. Medical and Scientific Illustration This is a specialised service offering high level illustrative skills to cater for the specific medical and scientific needs of both Trust and College staff.

The range of work extends from simple diagrams to complex anatomical drawings executed in a variety of media from line drawing to computer aided design using the latest design and illustration platforms.

Poster Preparation:

A full design, printing and laminating service is available for scientific posters.

Slide design:

For those staff who need computer slides prepared and require our assistance, we will be happy to design a presentation for you.

Preparing scientific posters:

Introduction:

Text, graphs and scanned Images are printed on a colour inkjet printer and normally laminated (up to A2 size). The panels are assembled in sections according to the space available at the poster session. Laminated banner titles can be produced up to 90 cm in length.

Stage I: - Initial design:

Find out from the conference organisers how much space is available for /our poster. You can then plan how the panels are to be positioned. The two examples below illustrate how you might arrange the panels if you were allocated a 1 metre square space at a poster session. You could either present the poster as 2-A2 panels or 9-A4 panels both with a 900x300mm banner title. Prepare a sketch of where your text and graphics are going to be positioned using standard scientific approach: Introduction, Method, Results and Discussion. Try to produce an overview rather than the complete story, which your mobile audience will not have time to digest. Remember that you or a fellow author will be present to answer questions about the work. If you have detailed information use handouts containing supporting data. The poster should ideally contain key points only.

Stage 2: - Input of material to computer:

Text can be entered to computer and saved in Word 6 or Rich Text Format (RTF) which will import into the Desktop Publishing programme, which we use for preparing scientific posters.

The file should be presented to us on disk together with any images which may need to be incorporated into the poster. Should you wish to prepare the poster panels yourself, PowerPoint 4 is the software we would recommend you to use. In this case text is entered directly onto each panel (slide). Images should be scanned and graphs prepared and inserted to accompany the text. To avoid printing problems only use Arial and Times fonts. It is vital for slide set-up to be adjusted to A4 format before importing material. Should A2 size be required we will enlarge each page by the correct proportion. We advise you against preparing your own banner titles.

Stage 3: - Printing and panel completion:

We use a large inkjet printer for outputting posters and banner titles which are printed onto special paper and finally heat laminated. The work is then trimmed to the required finished size.

Final points:-

It is entirely up to you the degree of help that you would like from us and we will be happy to assist you from the outset of the poster preparation to completion.

You may, of course, prefer to use the facilities that you have in your own department (computers, software, scanners, etc) but you may well find it

more cost-effective if you use our poster service in its entirety.

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Scientific Posters

Scientific posters printed on MIU's large format inkjet printer

Fully-electronic posters using computer software that handles text and graphics such as: MS PowerPoint (currently the most popular), Corel Draw, Adobe Illustrator, Adobe Acrobat (PDF) or Canvas can be printed on our large format inkjet printer.

When submitting your poster file for printing, it must be print-ready. All graphs and pictures should already have been imported into the poster. Our service includes an A3 draft for proof reading.

[Download](#) a printable version of this page.



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[Importing images and graphs](#) | [Beware of potential problems](#) | [Finally.. your poster...](#)

[How to get your poster to MIU](#) | [Payment](#)

Planning your poster

First, check with conference organizers on their specifications of size and orientation, **before** you start your poster. For example: maximum poster size and display area; the orientation, landscape (horizontal), portrait (vertical) or square format.

Bear in mind that you do not need to fill the whole space allocated by some organizers (eg. 4ft x 8ft / 120cm x 240cm, often used in the USA).

Do not make your poster bigger than necessary just to fill a given size. The average conference poster size is 84cm x 119cm (A0).

A poster is read like a newspaper or magazine. Plan your poster in columns of text, three, four, or five, depending on the poster's overall width, headed by a large banner containing the title, the authors' names and affiliation.

Software

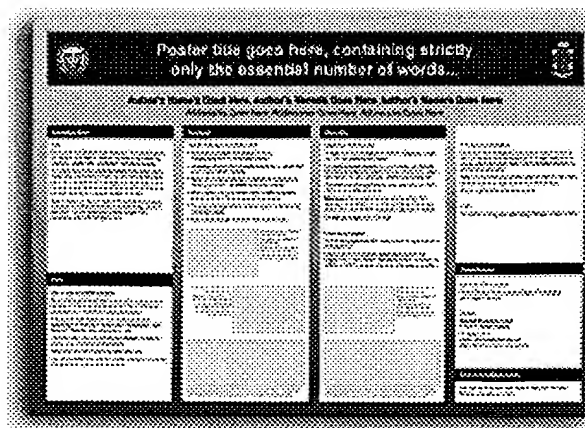
The following software and file types are supported by MIU for scientific poster printing.

Windows

- MS PowerPoint
- Corel Draw
- Adobe Illustrator
- Canvas
- Adobe Acrobat (PDF)

Macintosh

- MS PowerPoint
- Adobe Illustrator
- Adobe Acrobat (PDF)



An example of one of MIU's scientific poster templates.

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Production steps and design

Page size

- Check conference instructions for display area size or maximum poster size **before** you start.
- Set-up the page size of your poster before you begin production.
Note: If using one of MIU's templates, don't adjust the page size (we can scale-to-fit for you at the printing stage).
- In the absence of information, start with an A0 page size of 84 x 119cm (not A4!). This can be scaled to another size by MIU prior to printing.
- If the poster is being laminated, the maximum width is 95cm.

Poster margins

- A minimum of 2cm should be left between your poster's content and edge of the page.

Columns

- Make three, four, or five columns.
- Column widths and the number columns vary depending on the size of the overall poster width.
- Try to keep column width to a maximum of

Title

- A large banner containing the title, the authors' names and affiliations.

Font size

- Title: 85pt minimum (size will vary according to the length of the title).
- Authors and origin: 56pt minimum
- Sub-headings: 36pt minimum
- Body text: 24pt minimum
- Captions: 18pt minimum

Typeface

- Use plain fonts such as; Arial, Helvetica, Times New Roman.

Logos

- Hospital and UNSW logos are available on request at MIU, or directly from here: [Downloads](#)

Colours

- Your choice of colours should be visually

60 characters & spaces.

appealing to your audience. Remember it is a scientific poster that you are creating.

- Some colours may print differently than they appear on your computer screen.

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Tips for making a successful poster

- Re-write your paper into poster format i.e. simplify everything and avoid data overkill.
- Headings of more than six words should be in upper and lower case, not all capitals.
- Never write whole sentences in capitals or underline to stress your point. Use **bold** characters instead.
- When laying out your poster leave 'breathing space' around the text. Don't overcrowd your poster.
- Use plain fonts such as Arial, Helvetica, Times New Roman, or Univers.
- All body text should be the same size and style of font.
- Keep body text left-aligned. Do not justify text.
- Columns should not vary in width.
- Use photographs or coloured graphs wherever possible.
- Avoid long numerical tables. Convert complex tables to graphs or charts.
- Spell-check and get someone else to proof-read your poster.
- Poster templates designed by MIU can be downloaded to make your life easier.

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Importing images and graphs

Photographs, graphs, diagrams, & logos can easily be imported into your poster.

Image file sizes

The recommended size of the JPEG files (for posters!) is:

Inserting files into MS PowerPoint

- To insert scanned images, graphs, etc. go through the menus as follows: Insert / Picture / From File ... then find the file to be inserted, select it, and press OK.

Resolution

- Avoid 'resolution overkill' which can result in enormous file sizes (see 'Image file sizes').
- Never import images from the Web. They are not suitable for printing as the resolution is too small.

- Image size - 921x1276 pixels
- Print size - 13x18cm (5"x7")
- Resolution - 180dpi.
- Colour (RGB) - 320k JPEG file (3.37Mb when this file is open)
- B/W (Greyscale) - 180k JPEG file (1.13Mb when this file is open)
- If unsure, obtain advice from MIU first, or let us scan your originals.

File types

The best file type to import if you are using Powerpoint, is a JPEG file (high-quality/level 8).

Resizing an inserted image or graph

- Once the file has been imported into the poster, it can be resized by selecting it and dragging at a corner. Do not drag at other

points as the image will become distorted.

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Beware of potential problems

Page size and MS PowerPoint

- Changing the page size after finishing your poster can cause formatted text to move and imported objects and images to go out of shape.

Large file sizes

- If the poster file exceeds 100Mb in size, printing problems may occur.

Importing problems

- PICT files, SigmaPlot, Prism, SPSS, DeltaGraph & CricketGraph into PowerPoint (they might be visible on your screen but can print incorrectly or not at all). Preferably import only JPEG files or TIFF files.
- Imported scanned images are a potential source of printer errors.

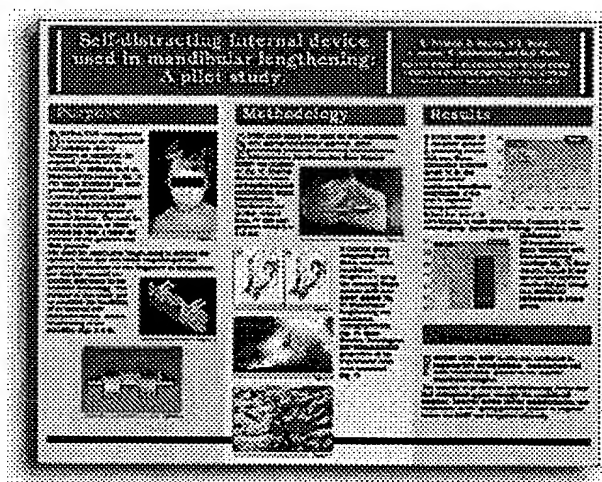
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Finally, your poster...

Your poster should be conceived as an advertisement for your ideas, findings or techniques.

Therefore good posters are the ones that apply the best techniques of salesmanship:

- Titles and subheadings should be short yet meaningful.
- The content should be concise and to the point.
- The design should be visually appealing, exploring capabilities of colour, graphics and typography.



How to get your poster to MIU...

- **Removable media:** CD-ROM, 100Mb Zip disk, 250Mb Zip disk, or 1.4Mb floppy disk
- **Email:** miunsw@unsw.edu.au

Note: Please phone us **after** emailing the poster, to ensure we have received it.

Beware: Files over 4Mb, get 'parked' by our Hospital server and transmitted overnight. **Do not** email files over 5Mb.

Payment

Local users (POWH, SCH, RHW, SESAHS, UNSW) can pay for their posters via internal account transfers.

UNSW staff need to know their Project/Grant number, Department ID and Fund code to complete an MIU-supplied "L30 Internal Debit"

Hospital staff need to obtain and authorised signature on an MIU-supplied "Cost Centre Transfer" form.

form.

External customers must pay by cash or cheque on the completion of the job (a UNSW tax receipt will be issued). Note: MIU does NOT invoice.

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Last updated on 7/4/2005

PREPARING A SCIENTIFIC POSTER

During the Michaelmas term of your fourth year, you will prepare a poster that summarises your Part III project work. The ability to design and produce an effective poster is now an essential research skill, because poster displays are a standard feature of most scientific conferences. This sheet gives some guidelines for successful poster production.

1. Poster format and purpose

- Your poster must fit on a vertical display board of a specified size. Those in the Earth Sciences department are typical, about 1200 mm wide by 900 mm high, with posters fixed by Velcro tabs on to a fabric surface.
- This size of display board can accommodate either
 - one A0 (1188 • 841 mm) sheet, arranged landscape (shortest dimension vertical), or
 - two A1 (841 mm • 594 mm) sheets, arranged portrait (longest dimension vertical), or
 - two Imperial (30" • 20" ... 760 mm • 510 mm) sheets, arranged portrait
- For conferences, your poster must be portable: either flexible enough to be rolled, or small enough to carry and maybe pack in luggage. Rigid A1 boards are unwieldy, and usually need cutting into halves (A2) or quarters (A3): this has practical design implications.
- The poster should have all the necessary text and graphics to make it self-explanatory. However, it should also be suitable for use at a formal 'poster session' where you might either have to summarise or field questions about your research in front of your poster.
- Your poster should offer something to two contrasting types of user: the 'browser', who may only give your work a brief look from a distance, and the 'ingestor' who pours in detail over every word and picture. Browsers need at least to see a clear title and one graphic that encapsulates the work and may attract them to look in more detail.
- Regard your poster as an advertisement for you and your work. A successful poster relies as much on effective design as it does on good science.

2. The components of a poster

Your poster will comprise some or all of the following design components:

- The *heading* comprises a title for the research, together with your name and affiliation. These items should be in a large enough font to be read at a distance of a couple of metres – at least 72 points (about 1") for the title and 36 points for your name.
- Your *contact details* should be included on a conference poster: a postal and Email address at least. This should be prominent, but in a smaller font than the heading. You can include your photograph to help people seek you out at a large conference.
- *Graphics* are the essential ingredient of any effective poster. They may comprise maps, charts, graphs, line drawings, photos, or any other relevant two-dimensional format. If possible, most graphics should be understandable without recourse to a detailed text caption. If possible, at least one graphic should be particularly eye-catching. Appropriate use of colour is essential.
- *Captions* are usually necessary adjacent to each graphic, to amplify its content for the detailed reader. However, captions should still be easily visible: use at least a 14 or 16 point font size.
- The *text summary* or *abstract* of the research has the same purpose as the abstract of a scientific paper, summarising the main results succinctly enough to be read in a minute or two.

This is the first and maybe the only component that browsers will read after they have been attracted by your title and graphics. The body text should be at least 16 or 18 point, with a larger or bolder title.

- The *body text* of the poster will describe methodology, data, results and interpretation. It should never dominate a poster – no more than a third of the poster should be text. The text should guide the reader logically through the graphics. The text is more digestible if it is split into logical sections interspersed with the graphics, rather than presented in one chunk. Use at least a 16 or 18 point font.

3. Planning the poster

- Decide the overall logic of the poster. Most posters have *sequential* sections, for instance aims > methodology > results > interpretation. However, other logical arrangements can be successful. A *radial* structure might have a hub comprising a text and graphic summary, surrounded by the discrete components of the project. Parenthetical *boxes* of text and graphics can amplify peripheral points in either a sequential or radial structure.
- List the graphics that you will need for the chosen structure. Do this *before* you write any text. You will then be forced to see the poster in the same way as the browsers who comprise the majority of your audience. You will almost certainly discover the need for a number of *interpretative graphics* to link and summarise the data and results that you already have available.
- Decide whether your poster components are to be *consolidated* on to one board, or *separated* on a number of smaller boards. The extreme strategy of putting each component on a separate small board makes for portability, but demands a lot of time (and Velcro!) to set up. Consolidation on A2 or A3 size sheets is a good compromise.
- Make preliminary pencil-and-paper sketches to explore how your graphics might fit your proposed poster layout. Allow some space for text at this stage.
- Make a physical mock-up of the poster. Either work at full scale, or at one-quarter or one-eighth scale on a piece of A4 graph paper. Use trimmed drafts of the actual graphics or scaled-down dummies. Do the same for captions, headings and the blocks of text. Physically rearrange all these components until you have a satisfactory layout.

4. Production

- These guidelines describe the *scissors-and-paste* method of production, where each component is physically stuck down on a poster board. You should use this method for your Part III poster.
- With the availability of A0 colour printers, *electronic* poster production is now popular, involving the assembly of components on-screen in a computer-graphics program. The two production methods differ little until their final stages, because most poster components are, in either case, produced by word-processing, graphics or presentation software. The main drawbacks of electronic production are the large file sizes needed for even a modest poster, and the cost of printing and laminating.
- Prepare all the individual components of the poster before pasting anything in its final position. This phase is the most time-consuming part of poster production. Getting the text to fit in the available space is a particular challenge. Always reduce the number of words rather than being tempted to reduce the font size below what is legible.
- Obtain the appropriate poster board. White A1 or imperial mounting board is available in the Drawing Office, or from Heffers Graphics Shop at about £2.50 to £3.00 per sheet. Coloured

board is about 50% more expensive than white board. Twice as expensive is a paper-faced 3.5 mm or 5 mm polystyrene sheet called Foamboard. This has no advantage for consolidated posters, but gives a pleasingly three-dimensional effect where components are separately mounted.

- Finalise the arrangement of components on the board. Either position them by eye, or use accurately measured faint blue crayon guide marks at two corners of each component.
- Stick down the components, fractionally overlapping any guide marks. Spray glue is convenient for most paper-based graphics or text. Lay the components, a few at a time, face down on a large desk-protecting sheet of plain paper. Spray components to their edges, leave for a minute or so, place in position, then press down firmly with a clean dry cloth or pad. Any traces of dried glue can be removed with a clean pencil rubber.
- Photographs are more safely fixed with 'Cow Gum' or with pads of double-sided tape. Spray glue is difficult to remove from photos.
- If the finished poster is going to be used repeatedly, it can be laminated with a plastic film. Enquire at print shops for costs. This is not necessary for a Part III poster.

5. Design hints

- Use a limited range of fonts and sizes. Two fonts, one for headings and one for blocks of text, are adequate. Use bold or italic versions of the same font in preference to a new font.
- Continuous text or figure captions can be read more rapidly in a *serif* font such as Times New Roman or Garamond. Headings have more impact in a *sans serif* font such as Switzerland or Arial, suitably emboldened.
- Use clear numbering or arrows to guide the viewer logically through a sequential poster.
- Use some colour on graphs, maps and other line drawings. Even limited use of a crayon or highlighter to emphasise key information makes a poster more lively and informative.
- Consider using a paper colour for the poster components that contrasts with that of the mounting board. White on a coloured background is the easiest effect to realise.
- The fashion for putting an outline box around every graphic, caption or block of text can look excessively busy. Boxes are better used to group related elements of the poster, such as data, methodology or results. Avoid the confusion of nested boxes-within-boxes.
- Do not rule out a 3D effect on part of your poster, as long as it can be transported and mounted satisfactorily. Simple examples are pin-and-string linkages between related elements, or foamboard mounts to key components. At the other extreme are sophisticated bits of paper engineering: see the childrens' section of any bookshop for what is possible.
- Don't fill every square centimetre of the poster board. Use _____ as a design element in its own right, to separate components and logical sections.
- In summary, aim for simplicity not complexity, use graphics in preference to words, and remember that good content and design will always be more effective than sophisticated production techniques alone.

Nigel Woodcock
01/11/99

Scientific Poster Production Meta HOWTO

Cut&Paste -- PowerPoint -- Illustrator -- Other Methods -- Software -- General Poster Advice -- Computer Labs/Printing

This page is intended as a meta-guide to scientific poster presentation. Rather than rehash everything that has already been published on the WWW, we merely link to it in an orderly fashion! You should find everything you need to produce your own perfect presentation poster. If, after scouring the Internet, you are still having problems, I suggest finding a friendly fellow student and offering her or him lots of beer to help you out!

There are several different ways to produce a poster for a scientific conference; the major ones are listed below. The PowerPoint method is probably the most common, and nicely balances ease of creation with a fair amount of flexibility. For large and/or complicated documents, LaTeX or Illustrator can't be beat. And, if you're a technophobe, the old method of cut-and-paste to a posterboard still works just fine (even though it is ugly...)

Manual cut-and-pasting to a posterboard

Old-school. Less convenient than using a software solution, but the ultimate in design flexibility. Time-consuming, but good for those who aren't all that comfortable with computers. However, these posters tend to look amateurish next to a properly designed and formatted PowerPoint or Illustrator produced poster. Make sure that, before you cut and paste any text pages together, that you have first sketched out the final appearance of the poster. Use a heavy cardstock poster board, and make sure that all elements are fastened to a corrugated backboard (heavy construction paper works well) before taping/pasting/pinning it to the posterboard. If you use rubber cement, make sure to get an even coat across the surface to be fastened.

Helpful Hints

- Preparing Professional Scientific Posters:
<http://www.ce.umn.edu/~smith/supplements/poster/guide.htm>
- Preparing a Scientific Poster: <http://www.esc.cam.ac.uk/new/v10/teaching/geology/ii-iii/posters1.pdf>

Microsoft PowerPoint / OpenOffice.org Impress

Both of these popular Office applications allow you to create a poster as a single oversized presentation slide. These applications have the advantage of a familiar user interface, OLE on a Windows platform, and are available almost everywhere (in case you have problems). PowerPoint presentations are limited in size to 56 inches by 56 inches by the software. However, you may be more limited by the roll of paper you need to print on; typical 'height' limitations are 24, 34, and 36 inches. Just about all of the restrictions and advice mentioned for PowerPoint is also applicable to OpenOffice.

Example PPT Posters

- <http://dke.cti.gr/panda/events/parma04/poster.pdf>
- http://www.eng.kagawa-u.ac.jp/~hasegawa/enq/mt_gokenzan.pdf
- <http://www.seismo.unr.edu/hazsurv/lvprof/Rasmussen-poster.jpg>
- <http://moho.ess.ucla.edu/~kagan/scec02a.ppt>

Helpful Hints:

The best way to prep a Power Point presentation is to make liberal use of guides, textboxes, and AutoShapes. I suggest downloading one of the sample templates just to see how other have done it. 1" margins on all sides seem to be sufficient, and avoid using text font sizes smaller than about 18-20 point. 30-32 point main text and 20-22 point italicized figure captions seems a good all-around compromise.

- MIU PPT Poster Templates: <http://miu.med.unsw.edu.au/downloads.htm#Scientific%20poster%20templates>
- University of California PPT Poster Templates: http://groups.ucanr.org/posters/Templates_for_Posters/
- Wayne State University PPT Poster Templates: <http://www.med.wayne.edu/biomedcom/postercreation/template/>
- Creating Large Format Posters in PowerPoint: http://www.wfubmc.edu/biomed/tipsheets/ppt_poster.html
- Creating a Large-Format Poster in PowerPoint: http://www.ssrl.brown.edu/support/design/large_posters
- Creating a Poster using MS Power Point: <http://depts.washington.edu/mphpract/ppposter.html>
- Introduction to Power Point (PDX): http://www.idsc.pdx.edu/support/intro_PPT.htm

Adobe Illustrator

If you have the time and the willingness to learn a new software package, Adobe Illustrator is the way to go to produce a professional, clean, and functional poster. It offers a wide variety of custom graphical and text tools, as well as multiple font and text formatting options, with the capability to print or export to almost any format. It is, however, an expensive piece of software with a learning curve.

Example Posters:

- Canadian Templates: http://icnet.ic.gc.ca/publication/english/layout-miseenpage/t-m_p-a_2_e.html
- Adobe Illustrator Poster Templates: http://www.ummumich.edu/facilities/groundworks/docsystem/howto/docs/poster/illust/ai_template
- UW CSE Large Color Printer Templates: <http://www.cs.washington.edu/lab/hw/printers/psclarge-templates.html>
- Poster Printing: <http://web.mit.edu/twagner/www/nh2/img/postertemp.zip>

Helpful Hints

The only advice I can give with respect to Adobe Illustrator is to get started on your poster early, and be prepared to spend a lot of time learning. If you've used DTP or other vector drawing programs before, the learning curve is somewhat less

- Creating Posters with Adobe Illustrator and Photoshop: http://morel.caltech.edu/nmw/pdfs/020717posters_illustrator/0717_CreatingPosters.pdf
- Making a Poster in Adobe Illustrator: http://www.science.smith.edu/resources/poster_printing/docs/AI%20Poster%20Making.pdf
- Getting Started with Illustrator: <http://www.oit.duke.edu/ats/training/illustrator.pdf>

- Creating Posters in Windows with Adobe Photoshop or Illustrator:
http://www.bme.jhu.edu/~bmay/poster/PC_posters.pdf

Other print production programs

Most sheet printers and plotters are designed to work with a wide variety of CAD/CAM and printmaking programs. The de-facto standard for the printing industry is PostScript. Any application that allows you to output or print to a PostScript document can then be sent along to the color plotter for printout. You may be more comfortable in one of these programs than the ones listed above, which should make the postermaking process faster. A list of several major pagemaking / layout programs that support PostScript are listed below.

- Adobe FrameMaker: <http://www.adobe.com/products/framemaker/main.html>
 - Poster Presentations (FrameMaker):
<http://www.geo.mtu.edu/departments/classes/ge511cpu/posters.html>
 - Making Posters with Adobe FrameMaker: <http://www.haystack.edu/~jmh/posterTemplate.pdf>
- Adobe InDesign: <http://www.adobe.com/products/indesign/main.html>
 - Making Posters with InDesign:
http://saturn.med.nyu.edu/facilities/mediaservices/posters/making_posters_id.html
- Corel Draw: <http://www.corel.com/servlet/Satellite?pagename=Corel2/Products/Home&pid=1047022690654>
 - Creating Single Sheet Posters with Corel Draw:
<http://cropandsoil.oregonstate.edu/Computing/poster/poster.html>
- Quark XPress: <http://www.quark.com/products/xpress/overview.html>
 - Quark Poster Printing Instructions: <http://labs.wvu.edu/bigprints/QuarkXpressInstructions.cfm>
- Microsoft Publisher: <http://www.microsoft.com/Office/publisher/prodinfo/default.msp>
- LaTeX (I recommend LyX for Linux, and TeXnicCenter for Win32): <http://www.latex-project.org/>
 - LyX Homepage: <http://www.lyx.org/>
 - TeXnicCenter IDE for Windows: http://toolscenter.texniccenter.org/front_content.php?idcat=26
 - Designing a Scientific Poster with Xfig and TeX: <http://www.linuxgazette.com/issue96/artime.html>
 - Scientific Posters with LaTeX: <http://www2.lut.fi/~jkamarai/misc/poster/latexhelp.html>
 - LaTeX Poster Macros: <http://fuse.pha.jhu.edu/~wolvern/posters.html>
 - Using LaTeX to produce conference posters: <http://www.astro.gla.ac.uk/users/norman/docs/posters/>
- AutoCAD: <http://www.autodesk.com/>
- ArcGIS/ArcInfo Workstation: <http://www.esri.com/>

The ArcPlot program is your friend for maps and large plots. However, this is not the most efficient way to develop a poster...

Helpful Software

The GIMP: <http://www.gimp.org/~tml/gimp/win32/> or <http://www2.arnes.si/~sopjsimo/gimp/> (Windows Installer)

An open-source re-implementation of the Photoshop toolkit (and much more!). This software has a steep learning curve, but once you become a master of Script-Fu, you'll never go back. If you can't afford Photoshop at home, or want to run the same image-processing software on Windows, UNIX/Linux, and Mac OS X, the GIMP is the one for you.

IrfanViewer32: <http://www.irfanview.com/>

A helpful package for manipulating and converting multiple images. Does batch operations on multiple graphics files (useful for SEM or digital camera images). Freeware for personal or home use.

OpenOffice: <http://www.openoffice.org/>

An open-source office suite. Very flexible, free, with good Java support. Has a built-in vector drawing program for creating custom images. Can output documents automatically to Adobe PDF, Macromedia Flash, HTML, or DocBook SGML. The built-in text to HTML converter is much more efficient and flexible than the default Microsoft Office HTML converter, and gives better results, too! Give it a try.

SnagIt: <http://www.techsmith.com/products/snagit/default.asp>

SnagIt is an advanced screen / window capture tool. It supports grabbing raster images from toolbars, open window elements, or finite regions of the monitor screen. Also allows you to take video (great for teaching students how to do a task!). It's not free, but it's a useful package to have in your toolbox.

General Poster Production Links

- Creating Effective Poster Presentations: *George Hess (NC State) and Leon Liegel (OSU)*
<http://www.ncsu.edu/project/posters/IndexStart.html>
- Poster Presentations: *Course notes for BIO 801 (Scientific Literature and Writing) Eastern Kentucky University*
<http://www.biology.eku.edu/RITCHISO/posterpres.html>
- Methods for getting documents to the IDSC (PDX) Plotter:
<http://wetlands.pdx.edu/software/plotter.htm>
- How Do You Prepare A Research Poster: *American Physiological Society*
<http://www.the-aps.org/careers/careers1/GradProf/glas.htm>
- Preparing Effective Posters: *Steve Porter (University of Washington)*
<http://faculty.washington.edu/scporter/INQUAposters.html>

PSU Facilities

Cramer Hall Room 322

Instructional Computing Classroom lab with Windows XP PCs with open hours. Software usable for posters includes PowerPoint, ArcGIS, Macromedia Fireworks MX (image editing), and Macromedia Freehand. For more information:

<http://www.cavs.pdx.edu/icc/info.php?page=2>

Cramer Hall Room 1

CH-1 is another ICC lab, with the same list of software as CH-322. Open hours are posted on the door by the first week of the quarter.

Cramer Hall 59: The Geology Lounge

The two black Dell Inspirons (GEOL_STRESS and GEOL_STRAIN) are probably the best computers to use. The other machines will be too slow for large-size posters. Software available includes Microsoft Office, OpenOffice 1.1, ArcView/ArcGIS, and IrfanView. Additional software, either open-source, freeware, or made available under a purchased University license, can be installed upon request.

Smith Student Union 18: The Instructional Development Support Center

The IDSC, also known as the Grad Lab (since it's officially only open to faculty, staff, and graduate students), supports the only easily accessible sheet plotter on campus. However, you can usually find a graduate student to vouch for you to print, or get a written note from the Department Chair to gain access. The lab hosts a ton of useful multimedia and graphic design software, including:

- Quark Xpress
- Adobe Illustrator 10
- Adobe Photoshop 10
- PageMaker 7
- InDesign 2
- Freehand 10
- Microsoft Office

For more information about the Grad Lab, please visit their webpage at: <http://www.idsc.pdx.edu/>

The IDSC hosts an HP DesignJet 755CM plotter for printing large-format posters. Typical dimensions are as follows: **Class C:** 17 x 22 inches; **Class D:** 22 x 34 inches; **Class E:** 33 x 44 inches. If you wish to use custom sizes, the printer is limited to 36 inches 'tall' by an effectively infinite length (I believe the standard single roll is 150 feet long). Printing costs are dependent of the amount and type of graphics (color, photos, or images). The IDSC accepts cash for the EXACT AMOUNT or personal checks. They **cannot** bill your University account. Costs:

- Lines and Fills (blocks of text, graphs, etc): \$5.00 per lineal foot
- Images (prints w/ 80%+ Coverage): \$10.00 per lineal foot

External Facilities

Kinko's Copies

Kinko's is a full-service copy and production facility. Some of the locations have computers with a

wide variety of graphic design software available by the hour. They can print anything, for a cost. Kinko's tends to be more expensive than the IDSC, but with much more flexibility as to poster sizes and formats (i.e. laminated posters, hardstock paper, etc.). They can also take credit cards...

- PSU Kinko's: 1400 SW 5th Avenue, (503)223-2056
- Downtown Portland Kinko's: 221 SW Alder Street, (503)224-6550
- Lloyd Center Kinko's: 1605 NE 7th Street, (503)284-2129

Clean Copy

They supposedly can print large posters, and is cheaper than Kinko's. I have NOT verified this, however. No in-house computer facilities.

- 1704 SW Broadway, (503)221-1876

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Guidelines for Preparing Scientific Posters in the Digital Age

Introduction

The proliferation of poster presentation sessions at scientific meetings and conferences has grown in response to exponential advances in contemporary research in science, technology and medicine. During the past thirty years, the need to communicate, disseminate, document and preserve new research has outstripped the capacity of scientific sessions at scholarly meetings and conferences. As a result, posters have evolved into the third leg of a scholarly publication tripod, joining abstracts and published papers in journals as an essential component of scientific communications.

For example, one of the largest organizers of scientific information, the American Heart Association, first began considering poster sessions as an effective and inexpensive technique for presenting research only in 1974 when requests for simultaneous traditional sessions exceeded conference space and time constraints. In 1976, the AHA approved poster sessions on a one-year trial basis and 180 abstracts were accepted, on the basis of scientific merit, as posters. In 2000, nearly 50 percent of abstracts, or about 3,000 posters were approved and presented at AHA's annual scientific conference. Other associations and learned societies conduct poster sessions ranging from ten to over 13,000 presentations at a single conference, and this year it is estimated that over 500,000 poster presentations will be accepted worldwide.

The majority of scientific posters today are still assembled and displayed using the same cut and paste techniques used for the past three decades, but digital design, production and printing services for posters will no doubt grow in popularity in years to come. Digital alternatives have become surprisingly affordable and offer many advantages over do-it-yourself techniques. Digital production processes circumvent the complex spatial and proportional design issues inherent in hand assembly, producing posters that are more professional looking, more convenient to transport, and easier to reproduce in small sizes for handouts than traditional cut and paste methods. Presentations produced in this manner are ready to archive and disseminate electronically as well.

TO VIEW E-
POSTER

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OR FILE
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ID#

The guidelines presented here are meant to offer hints and tips for the preparation of posters using the digital production and printing process. Although digital poster preparation eliminates the need to be one's own designer or art director, there are some basic principles to consider in order to create an effective presentation of information about important research on serious topics. Many of the principles presented here address special considerations specific to the utilization of digital graphic arts technology, but these guidelines also contain aesthetic and practical suggestions that can be applied to all preparation and production techniques.

Poster Design Objectives

As visual explanations, scientific posters need to be judged by their presentation as well as their content. As concise communication tools used in presentations given to small groups of people in short informal and interactive sessions, posters also need to attract viewers and provoke curiosity. Effective poster design addresses these purposes through the proper arrangement of information, graphical elegance and clear representations of complex data.

In poster construction, this involves the elements of text, graphics and tables. Although different mechanisms, they have a single purpose - the presentation of information about useful and important research on serious topics.

Making efficient and convincing summaries of data are difficult tasks, but the process can be managed by recognizing that the clarity of the presentation stems from the proper arrangement of information and that graphical elegance is often found in simplicity of design and complexity of data.

Preparation

The key to effective poster display is preplanning and preparation - which always takes longer than one thinks. William Warriner in his book, 101 Corporate Haiku, captures this eternal lesson using the insight inherent in traditional Japanese poetry:

Objects reflected
in a project schedule are
closer than they seem.

The key to planning for attractive, professional looking displays is plotting the flow of information. This flow should have a narrative quality, telling a story using the basic elements of words, tables and graphics together. Even before considering a design, or choosing a format from a digital poster printing service, plot the research story and analyze what details have the richness, intricacy and relevance needed to understand the complexity of the research.

Poster Design

Conventional wisdom might conclude that because scientific posters offer concise visual explanations of complex research that it is best to reduce the quantity of detail and simplify data. But the fact is that the quantity of detail and texture of the data is an issue completely separate from difficulty in reading. Clutter and confusion are failures of design and not attributes of information. Poster displays portray complexity and intricacy because the content is complex and intricate.

Effective posters are both accessible (viewer friendly) and rich in detail. They are simple in design, avoiding excessive content-free decoration, but complex in data. They may be simple but they never patronize their audience.

Here is a set of tips to make posters accessible:

- The poster size should meet conference guidelines for size and content
- The title of a poster should state the conclusion of the investigation rather than the process of what was done
- The heading should include the authors' names and affiliations
- Lettering for titles should be readable from at least 6 feet away - use no less than 1-inch high type
- Words should be spelled out, avoiding mysterious abbreviations to decode
- Words should run from left to right
- The text, tables and graphics should look integrated. The same typeface should be used for all and ruled lines separating different types of information should be avoided
- Type should be in upper and lower case in a sans serif face (e.g., Arial) that is clear, precise and modern
- Lines of text should contain about 10 to 12 words
- Lettering for text in the body of the poster should be readable from at least 4 feet away - use no less than ½ inch high type
- Color should be used sparingly and not with great contrast
- Tables are preferable to graphics for small data sets
- Tables also work well when data presentation requires many localized comparisons
- Explanations should be used to enhance access to the richness of data and make graphics more attractive to the viewer
- Words and illustrations should go together - tables and graphics should be integrated within the text whenever possible, avoiding clumsy diverting segregation

- Lines in data graphics should be thin
- Graphics should tend toward the horizontal, greater in length than height, ideally 50 percent wider than tall
- Elaborately coded shadings, cross-hatching and colors should be avoided
- Little messages help explain data. Labels should be placed on the graphics itself, no legend is required

Working With a Digital Preparation and Printing Service

Although there are many digital printing options available, it is always best to use a service specializing in the communication of scientific information. These specialists usually offer templates that mirror the scientific process, understand poster session presentation protocol, and are able to recognize glitches that occur when sending and translating software programs, especially confusion over scientific notation.

Here are additional suggestions using digital processes:

- Make sure the graphic arts service has upload/file transfer capabilities. Attaching graphic elements to e-mail often outstrips the capacity of many servers
- Make sure you inform your graphics arts service the platform you produced your files in. (i.e. PC or MAC): This will decrease chances of translation problems
- When using fonts other than System fonts (Arial, Helvetica, Times etc) be sure to include the original font files otherwise you may end up with a default System font
- Make sure that your images and logos are not taken from the Internet. The reproductive resolution of Web images is generally too poor for high-quality, large-format printing. 300 dpi EPS, TIF and JPEG formats are generally fine for images and logos
- Supply original images whenever possible. Images embedded in presentation or word processor programs (PowerPoint, Word, Canvas, etc.) may limit the ability to enlarge your figures
- Make sure the service offers electronic approvals via electronic files that can easily be sent to you via e-mail
- When checking for approval, make certain to read your text thoroughly. It is not uncommon for design software to mistranslate symbols when importing from other file formats
- Make sure that the service offers to explain screen color versus printing color differences to avoid surprises in the finished poster
Make sure to handle your images with care. When scanning images, coffee stains, tears and rips will reproduce

An effective poster is a marvelous communication vehicle, essentially transforming rich, dynamic and multidimensional work

onto a flat 4-foot by 8-foot surface. Telling a logical narrative with a simple design and complex data can transport, inform and delight viewers in ways that can't be conveyed even with a published paper or abstract. Properly executed, the scientific poster becomes a visual experience that repays over and over again.

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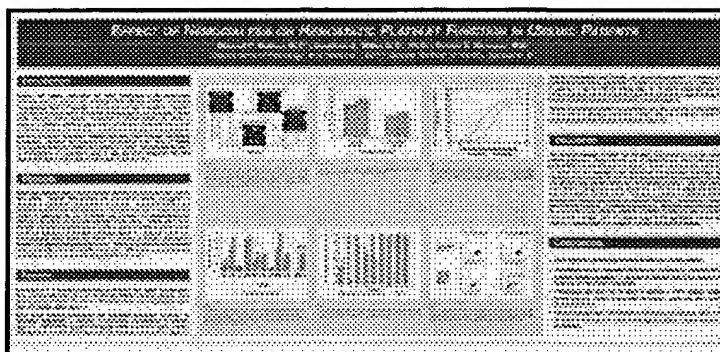
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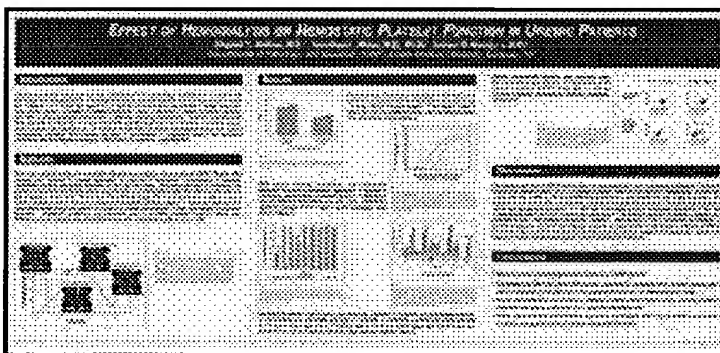
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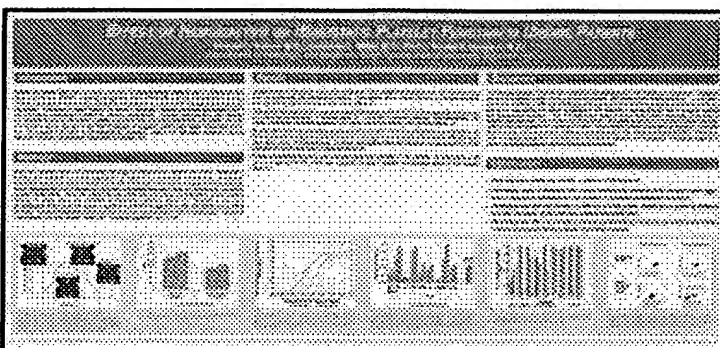
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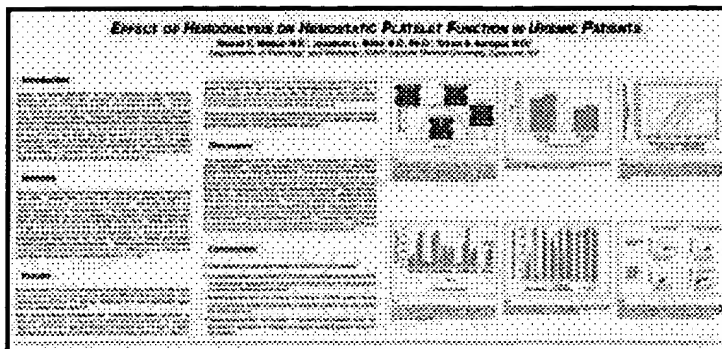
Images in this poster are center aligned.



Images in this poster are interspersed with text.



Images in this poster are bottom aligned.



Images in this poster are right aligned, poster has no background color.

Original posters printed at 42" x 60"

E-Posters are viewed using Adobe Acrobat. For your free copy, click on the link below.



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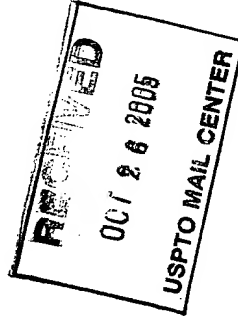
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